

KHR-12
March 1988

Chronology of KSC and KSC Related Events for 1987

National Aeronautics and
Space Administration

John F. Kennedy Space Center



**CHRONOLOGY OF
KSC AND KSC RELATED
EVENTS FOR
1987
Selected
by Ken Nail, Jr.
Archivist
New World Services, Inc.**

00000810

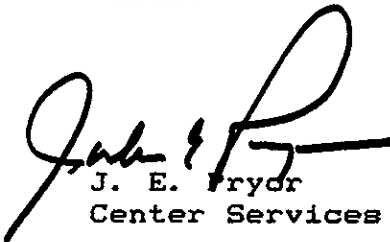
FOREWORD

This Chronology is published to fulfill the requirements of KMI 2700.1 (as revised) to describe and document KSC's role in NASA progress.

Materials for this Chronology were selected from a number of published sources. The document records KSC events of interest to historians and other researchers. Arrangement is by date of occurrence, though the source cited may be dated one or more days after the event.

Materials were researched and prepared for publication by historian-archivist Ken Nail, Jr., with the assistance of Elaine Liston, both of New World Services, Inc., EG&G subcontractor for KSC Library Services. This year an index has been included for added convenience to researchers. For further convenience, each entry is headlined.

Comment on the Chronology should be directed to the John F. Kennedy Space Center, NWSI-E, Kennedy Space Center, Florida, 32899.



J. E. Pryor
Center Services

CONTENTS

JANUARY.	1
FEBRUARY	12
MARCH	19
APRIL	30
MAY	40
JUNE	48
JULY	56
AUGUST	64
SEPTEMBER	71
OCTOBER	75
NOVEMBER	80
DECEMBER	87
INDEX	94

JANUARY

January 5: NASA BUDGET

NASA would receive \$9.8 billion under President Reagan's proposed fiscal 1988 budget. The proposal would include money to start building a space station and constitute a real growth of more than 11 percent after the \$2.1 billion replacement cost of a shuttle is subtracted from this year's \$10.5 billion budget, according to NASA officials.

Reagan's budget calls for \$3.7 billion to continue overhauling the shuttle fleet and resume launching in early 1988, and \$767 million to begin final design and early construction of the space station.

Kennedy Space Center would get \$20 million for two major construction projects - an operations support building for shuttle launch complex 39, and a space station processing building. KSC would also be able to add some 625 new civil service jobs and some new contractor jobs. NASA plans to rehire some of the more than 2,000 workers laid off after the Challenger accident, but that recall will not come till late in 1987, according to Dale Myers, NASA Deputy Administrator.

The new operations support building - to be located southwest of the Vehicle Assembly Building - will be a five-story concrete-and-steel structure costing \$17 million. The 188,000-square-foot building would house about 1,500 space center employees, said NASA spokesman Jim Ball. About 3,000 people now work out of temporary trailers near the VAB, Ball said. The building would contain office space, conference rooms and support areas for shuttle operations.

A second building - expected to cost \$3.6 million for initial site work - would be KSC's space station processing facility. Funds for the facility itself probably would be requested in the 1989 budget, Ball said. [Fisher. THE ORLANDO SENTINEL, pp. A1 & A-4, Jan. 6, 1987. Halvorson. FLORIDA TODAY, p. 1B, Jan. 6, 1987.]

<>

CHALLENGER LICENSE PLATES

The latest of a thousand specially produced Challenger license plates bearing the letters "KSC" was sold this afternoon, less than two days after they went on sale. The last one was bought at about 4:15 p.m., said Brevard County Tax Collector C. N. "Newt" Jones. About 800 of the plates were sold the first day they were available to the public; none were available over the weekend.

"There was quite a clamor for the plates that had KSC on them," said Don Beck, Brevard County chairman for the Astronauts Memorial Association which gets the proceeds from sales of the special tags. Plenty of the special-edition Challenger tags with standard letter-number combinations remain available. Tax Collector Jones said 220,000 Challenger plates have been issued statewide, with 22,500 having been sold in Brevard County. [Brown. FLORIDA TODAY, p. 4B, Jan. 6, 1987.]

January 6: CHALLENGER DEBRIS

Challenger debris will be buried Jan. 8, NASA officials said, having been given the go-ahead by the U.S. Justice Department. The debris will be stored in two abandoned Minuteman silos at Cape Canaveral Air Force Station, said Hugh Harris, spokesman for Kennedy Space Center. "They had no objection to us putting it in storage," said Harris. Currently, the barnacle-encrusted wreckage is being kept in a warehouse and a makeshift hangar at the space center. [Halvorson. FLORIDA TODAY, p. 13A, Jan. 8, 1987.]

January 8: CHALLENGER DEBRIS BURIAL

The burial of debris from the space shuttle Challenger's 51-L mission began today when a large crane lowered the first cardboard crates into an abandoned missile complex at Cape Canaveral Air Force Station just before noon. NASA expects the storage process to take two months. Only a few parts of Challenger are still being analyzed by scientists and personal effects of the seven-member crew won't be buried at this time, said NASA spokesman Hugh Harris. The silos which will house the debris will be covered with four concrete slabs weighing 10,000 pounds each and retrieval of debris will still be possible.

Some of the 15 persons involved in the storage operation said they are looking forward to returning to the jobs they held before the Jan. 28, 1986, tragedy. "I think we are all ready to close this project out and get back to our jobs associated with launch activities," said Elliot Kicklighter, supervisor of NASA's shuttle debris storage team. "We all hope we never have to do anything like this ever again."

Ron Phelps, previously a shuttle project manager, said working on the debris storage team was trying at times. "After a year of working with the debris, you kind of get used to it. But every now and then, you walk by something that brings back memories." [Brown. FLORIDA TODAY, p. 1A, Jan. 9, 1987.]

January 9: LOCKHEED REHIRING ANNOUNCED

Lockheed Space Operations Co. announced that it would rehire 90 workers this month and more in the coming months as NASA prepares for the first post-Challenger mission, said SPC spokesman Stuart Shadbolt.

About two-thirds of the workers will be persons laid off after the Challenger tragedy and the completion of other space-related projects at Kennedy Space Center. Another third of the workers will be transferred to KSC from Vandenberg Air Force Base in California. The remainder of the new hires will be persons who have special skills. "This will be an unusual month," said Shadbolt. "We'll not continue that rate in February, March and April."

Other KSC contractors reported no immediate plans to recall laid-off workers. Boeing will rehire an undetermined number of workers in late spring, according to Leslie Neihouse, speaking for that company. McDonnell Douglas will rehire employees in late summer, but not the entire 237 who lost their jobs, said company spokesperson Pat Oliver. EG&G's Laurie Statmore said her company had no plans to recall laid-off workers. [Druckenmiller. FLORIDA TODAY, p. 1A, Jan. 10, 1987.]

<>

BOEING LAYOFFS

In a separate development, Boeing spokesperson Leslie Neihouse said the company would lay off about 40 persons effective Jan. 20. The layoffs of technicians involved Boeing's Spacelab Experiment Integration Support program and were prompted when McDonnell Douglas Astronautics Co. won a six-year, \$327 million payload processing contract at Kennedy Space Center.

"When McDonnell Douglas won the Payload Ground Operations Contract on Dec. 3, they absorbed that function. We had 52 people doing that same kind of work and now that slot of work falls under McDonnell Douglas," Neihouse said. She said that of the 52, about eight would remain with the company, with some of the remaining 44 transferring to other

Boeing divisions. About 15 to 20 of the 40 workers to be laid off were expected to go to work for McDonnell Douglas, a point confirmed to some degree by Pat Oliver, spokesperson for McDonnell Douglas. [White. FLORIDA TODAY, p. 9A, Jan. 10, 1987.]

January 11: STANDBY SCRUB TEAM

NASA has decided to create a standby "scrub team" so launch managers can get adequate rest when shuttle countdowns are scrubbed. Launch officials also said they are ordering a sharp reduction in Kennedy Space Center overtime - to be "rigidly observed" - as a way of eliminating the long hours worked by shuttle engineers, technicians and managers.

Deputy Center Director Thomas Utzman said, "We've got to address the manning levels to preclude us from getting into an overtime situation....We're simply not going to have our people stressed to where they can't make judgments in a more conscious way." ["'Scrub Teams' to Give NASA A Rest," FLORIDA TODAY, p. 1A, Jan. 12, 1987.]

<>

SECURITY HEIGHTENED

Security has been heightened at both Cape Canaveral Air Force Station and Kennedy Space Center after 21 protesters against the testing of a Trident 2 nuclear missile were arrested over the weekend. According to both Air Force and

protester sources, the arrests occurred at the following times and places:

FRIDAY, 7:30 a.m. - Four men and one woman were apprehended in different locations on a beach within the base boundary. They had hiked from Playalinda Beach in Titusville, according to Air Force spokesman Lt. Col. Bob Nicholson.

FRIDAY, 3:00 p.m. - One man and three women were arrested after they slipped away from a Spaceport USA tour bus and hid in the nearby brush, said Nicholson. The driver noticed they were missing and called security.

SATURDAY, 5:30 p.m. - Two men were arrested by KSC security near the Space Shuttle Landing Facility. One man flagged down security officials after the other suffered an epileptic seizure, an Air Force Spokesman said.

SUNDAY, 12:50 a.m. - Two men were arrested by KSC security in a restricted area of the Banana River near NASA Causeway.

SUNDAY, 2:30 a.m. - A man was arrested in the northern part of CCAFS near its border with Kennedy Space Center.

SUNDAY, 4:15 a.m. - A woman (Willa Elam) walked to Launch Complex 40, in the northern part of CCAFS; she climbed to the 13th level and called security police, said protest spokesman Dennis Doyan.

SUNDAY, 9:00 p.m. - Three men were arrested on Kennedy Space Center property between SR 402 and Launch Complex 39B near the beach. [Willmoore. FLORIDA TODAY, pp. 1A-2A, Jan. 12, 1987, and FLORIDA TODAY, pp. 1A-2A, Jan. 13, 1987.]

January 13: CANAVERAL SEASHORE FEES

The National Park Service denied NASA's request to delay charging fees at Canaveral National Seashore till the space agency studies the question and develops its own plan. Park Service Regional Director Robert Baker said, "The points NASA made were looked at, but we needed to start this program this year; we need the money."

Lt. Gen. Forrest McCartney, Director of Kennedy Space Center, told the park service in a letter Dec. 24 that NASA had "serious reservations about charging fees" and believes that the park's "unique joint use deserves special consideration." Kennedy Space Center spokesman Hugh Harris said, "NASA is concerned that the public might feel misled with the fees. People buying an annual pass may not understand that the circumstances around closing the beach have not changed. With a pass, no one will have any more access than in any other year." [Lancaster. THE ORLANDO SENTINEL, pp. D-1 & D-5, Jan. 14, 1987.]

January 14: ATLAS-CENTAUR FUEL LEAK

A fuel leak has delayed the launch of an Atlas-Centaur rocket from Feb. 26 till March 26. The launch was to have put a military FLTSATCOM satellite into orbit. Technicians checking out the rocket's Atlas stage found a fuel leak in a section of the rocket that houses a high pressure turbo pump, said NASA spokesman George Diller. "There was enough doubt in our minds that we decided we didn't want to take a chance," he said.

As a precautionary measure, NASA will exchange the leaking Atlas stage with one that had been scheduled for a May launch. The leaking Atlas stage will be returned to its California manufacturer - General Dynamics Corp. - for repair said Diller. [Halvorson. FLORIDA TODAY, p. 4A, Jan. 15, 1987.]

January 16: PRC SYSTEMS SERVICES EXTENSION

NASA's Kennedy Space Center awarded a \$1,503,171 contract extension for engineering services to PRC Systems Services (Cocoa Beach, FL). [Boles. NASA/KSC NEWS RELEASE NO. 7-87, Jan. 16, 1987.]

January 19: SPECIALTY MAINTENANCE CONTRACT

Specialty Maintenance and Construction Inc. (Lakeland, FL) has been selected to enter into final negotiations for an annex addition to the Orbiter Processing Facility at Kennedy Space Center's Launch Complex 39. The \$3.1 million contract also provides for Specialty Maintenance to modify the heating, ventilation and air conditioning system on the existing OPF annex. ["KSC Contract Negotiated," FLORIDA TODAY, p. 16C, Jan. 20, 1987.]

January 21: MEMORIAL SERVICE: GEORGE MURPHY

A memorial service will be held at 11 a.m. at Kennedy Space Center for the late George Murphy, 60, executive vice president and general manager of space booster production for United Technologies. Murphy, who died last week in Huntsville, AL, had directed the company's work at KSC for two years before moving to Alabama in 1986. ["Service for Booster Executive 11 A.M. Today at Space Center," THE ORLANDO SENTINEL, p. B-4, Jan. 21, 1987.]

January 22: FEB. 18, 1988 LAUNCH DATE

NASA officials told Congress that Feb. 18, 1988, is not a "magic date" for the next shuttle flight and that it will not be launched if safety is in doubt. "We will not fly until we are ready," said Rear Admiral Richard Truly, the former astronaut who is NASA's Associate Administrator for Space Flight. While NASA previously has insisted the Feb. 1988 launch date - the first scheduled flight since Challenger - is realistic, Truly told a Senate space subcommittee, "There are threats to it. We may not make it." [Bumstead. FLORIDA TODAY, p. 4A, Jan. 23, 1987.]

January 25: BREVARD'S CHALLENGER TRIBUTE

In Brevard County, more than 50,000 students and teachers from 67 schools will participate in flag-raising ceremonies at 10 a.m. to pay tribute to Challenger's crew. All Brevard schools will hold simultaneous flag-raising activities using the Flag of Learning and Liberty, a symbol of education that was carried by teacher Christa McAuliffe aboard the shuttle Challenger. In Titusville, the city's Flag and Memorial Committee will sponsor a Wednesday ceremony honoring the Challenger crew and the three astronauts who were killed in the Apollo 1 fire Jan. 27, 1967. Area churches will also have memorial services. [Jean. THE ORLANDO SENTINEL, p. B-1, Jan. 25, 1987.]

January 26: MCCARTNEY PREDICTS 1,000 REHIRES

Kennedy Space Center Director Lt. Gen. Forrest McCartney predicted that up to 1,000 KSC workers laid off after the Challenger accident will probably get back to work later this year. Speaking to retired military officers at Patrick Air Force Base, McCartney said the rehiring plan shows that the space program is recovering.

Representatives from three shuttle contractors confirmed they planned to start rehiring within the next several months as NASA prepares to launch Discovery Feb. 18, 1988.

Officials from Lockheed Space Operations Co. (SPC)-the largest shuttle contractor at KSC - announced the addition of 90 workers to their payroll earlier this month and two thirds of these had been among the company's 1,200 workers laid off after the Challenger tragedy. A company spokesman said Lockheed expects to be "back up to near full-strength sometime this summer."

Boeing Aerospace Co. officials, who laid off 40 KSC employees the first of this year, plan to recall "a couple dozen" workers in May. EG&G Florida Inc. officials said they may recall some laid-off workers this fall. McDonnell Douglas Astronautics Co. officials could not be reached. [Brown. FLORIDA TODAY, p. 1B, Jan. 27, 1987.]

January 26: MANAGEMENT, PROCEDURES CHANGED

At Kennedy Space Center, extensive management and procedural changes are being refined to assure that future shuttle processing conforms to the advice of the Rogers Commission which investigated the Challenger accident. A member of that commission said that "some of the pre-accident procedures [at KSC] were 'an accident waiting to happen'," reported Edward H. Kolcum in AVIATION WEEK & SPACE TECHNOLOGY.

Lt. Gen. Forrest McCartney, new KSC director, said his objective is to resolve the shortcomings before the orbiter Discovery begins its processing. He said that schedule will continue to be an important factor in the program, but it will not be paramount. He said that mission drivers in the future will be safety and success.

"We will not go to the launch pad without closing out all paperwork," McCartney said. "If any capable official expresses concern over anything, we will look into it. Overtime simply is not going to continue the way it has been in the past. The stress was too great on people, and no more will anyone work six 12-hour days in a row without a break. Of course, overtime will be involved when a job must be completed, but we are aware of the stress this puts on all the workers and managers." [Kolcum. AVIATION WEEK & SPACE TECHNOLOGY, p. 77, Jan. 26, 1987.]

January 28: CHALLENGER COMMEMORATION

At 11:38 a.m., work stopped at Kennedy Space Center as its employees paused for 73 seconds to commemorate the Challenger crew. Challenger's 51-L mission lasted for 73 seconds one year ago before ending in tragedy. Thousands of workers stood quietly outside buildings, gazing toward Launch Complex 39B from which the Challenger had lifted off and looking toward the spot in the eastern sky where so many of them had seen the shuttle explode in a deadly fireball.

Tour buses stopped and 900 riders stood silently on the roadsides. At Spaceport USA, an immediate hush fell over some 800 other tourists. "Everybody was absolutely quiet. They never moved an inch," said George Meguiar, an official with TW Services Inc., which operates the KSC visitors center.

Shortly before 11:38 a.m., KSC Director Forrest McCartney, who attended a memorial service at Arlington National Cemetery, spoke over the public address system at Kennedy Space Center. "It was exactly a year ago today...that our national space effort had one of its most severe setbacks. A year ago, we lost Challenger and its crew of seven astronauts. They were not only the crew of Challenger," he said, "they were friends and co-workers. That brave crew of Dick Scobee, Mike Smith, Ron McNair, Ellison Onizuka, Judy Resnik, Greg Jarvis and Christa McAuliffe, will always be in our memories."

"Today, all around the NASA installations, flags will be lowered to half-mast in honor of these fallen comrades. It is most appropriate that you join with me in 73 seconds of silence in remembrance of the crew members of Challenger," said McCartney. Moments later, three KSC security guards lowered an American flag at the same site where 1,800 people had gathered a year earlier to watch the launch of Challenger's 51-L mission.

At the VIP grandstands, the small crowd on consisted primarily of 200 news media representatives and a small group of NASA workers. As the period of silent commemoration ended, McCartney spoke again: "As we return to our work places, we should keep the memories of the Challenger crew bright within us. Let us rededicate

ourselves to the work ahead - work that they will always be a part of," he added.

Just before the tribute, KSC employees received a telegram from the six survivors of the original Mercury Seven astronaut team and the widow of the seventh. "We, along with the rest of the world, remember with reverence the heroic crews and families of Apollo 1 and Challenger, and with gratitude for their ultimate sacrifice and dedication," the telegram said. "We now look to the future, bright with promise," it concluded. The telegram was signed by Alan Shepard, Deke Slayton, Gordon Cooper, John Glenn, Wally Schirra, Scott Carpenter and Betty Grissom, widow of Gus Grissom, who was killed in the Apollo 1 fire, Jan. 27, 1967.

Later in the day, all NASA employees and contractors at the space center were addressed by President Reagan via a satellite television hook-up from the White House. The President said, "In the first moments of grief and shock, the bereaved families of the crew urged us to carry on and keep the space program moving forward. We owe it to them, and those whom we've lost, to do just that." Even before Reagan spoke, work had already resumed on NASA's three remaining shuttles in the Vehicle Assembly Building and in two orbiter processing facilities. [Halvorson. FLORIDA TODAY, pp. 1A-2A, Jan. 29, 1987.]

January 29: PRC LAYOFFS

Planning Research Corporation trimmed its Kennedy Space Center workforce by 40 percent today with more layoffs imminent. The 140 being laid off came as a result of a NASA contract consolidation in 1986. Another 140 persons were expected to be without jobs. The 70 remaining PRC workers at KSC are under contract till September. [Halvorson. FLORIDA TODAY, p. 1B, Jan. 30, 1987.]

<> GOES READY FOR LAUNCH

The GOES (geostationary operational environmental satellite) was pronounced ready for its expected Feb. 19 launch aboard a Delta rocket from Cape Canaveral Air Force Station. The critically important weather satellite was built by Hughes Aircraft. When launched, the new GOES will join an aging satellite of the same type. The GOES is not only important for tracking hurricanes, but also carries instruments to

study the effects of solar activity and magnetic fields in space. [Glisch. THE ORLANDO SENTINEL, p. A-9, Jan. 30, 1987.]

January 31: SPACEPORT USA ATTENDANCE

Attendance at Spaceport USA totaled 152,864 visitors, an 11.8 percent increase over the previous January. "Interest in this country's space program is certainly evident in the way the public continues to visit Spaceport USA," said H. B. Chambers, vice president and general manager of TW Services Inc., managers and operators of the attraction. ["Spaceport Attendance at Record," FLORIDA TODAY, p. 16C, Feb. 3, 1987.]

FEBRUARY.

February 4: LAUNCH DECISION TELECONFERENCES OUT

Kennedy Space Center will replace cross-country teleconferences with face-to-face meetings when senior NASA and contractor officials make the final decision to launch the Discovery in 1988. The decision was revealed in a recent interview with Shuttle Launch Director Robert Sieck. The change was made, according to Sieck, to ensure that the "flawed decision" to launch Challenger will not be repeated.

"The reason for (the change) is to make sure all the information presented is understood by all the participants who are going to have to agree that they've seen everything and heard everything," Sieck said. "There's not going to be the speculation or the uncertainty that was brought out in the commission findings.

"When you're discussing a technical issue or any major controversy, talking face-to-face is much better than talking over phones," Sieck said. "It's fine to use (teleconferences) to spread information around, but when you want everybody's involvement in a decision, you want to make sure there's no misunderstanding at all. And the only way to do that is face-to-face."

Morton Thiokol's spokesman Gilbert Moore said the change made good sense. "It's logical," he said. "It would certainly serve to help eliminate any difficulties in communication."

Another change in launch countdown procedure is the establishment of a new policy to govern the imposition and removal of "launch constraints" - problems with shuttle systems that must be resolved before a mission, said Sieck. He said NASA is developing a policy in which managers will "pick a point in time when no more changes (or waivers) can be made to the existing launch commit criteria."

After that point, said Sieck, "if somebody is proposing a change or a deviation to the criteria, we would just stop the process, reset a new launch date, and go back and look at the (proposed) change." Sieck said, further, that NASA

will improve its documentation of all facets of the launch countdown procedure prior to the first post-Challenger shuttle mission. "The launch countdown procedure will be much more defined and formalized in the future, and the procedure is going to be much more documented. And I think that's what gives me the confidence that nothing will be overlooked." [Halvorson. FLORIDA TODAY, pp. 1A-2A, Feb. 4, 1987.]

February 6: NOAA SATELLITE LAUNCH DELAYED

NASA has postponed the planned Feb. 19 launch of a weather satellite for at least five days. The delay was caused by a problem in a switching mechanism on the NOAA satellite. The switch selects between a pair of transmitters that send image data to the spacecraft's central processing facility on the ground, said NASA spokesman George Diller. The earliest possible launch for the Delta rocket would be Feb. 24 between 5:44 and 6:17 p.m. [Halvorson. FLORIDA TODAY, p. 8A, Feb. 7, 1987.]

February 10: NEW SPACEPORT EXHIBITS PLANNED

Spaceport USA, following its record attendance in 1986, announced plans to spend more than \$4 million on new exhibits and improvements in 1987. The attraction intends to open a NASA art gallery, add a future-in-space audio-visual show, open a \$2.3 million satellite exhibit and expand its display on space research. In 1986, 2.1 million people toured the visitors center, an increase of 18.6 percent from the 1.8 million who attended in 1985. Revenue was up to \$24.8 million from \$19.2 million the previous year; profit rose from \$781,000 to \$1.5 million. [Hinman. THE ORLANDO SENTINEL, pp. B-1 & B-6, Feb. 11, 1987.]

February 11: EG&G FLORIDA RATED "EXCELLENT"

EG&G Florida, base operations contractor at the Kennedy Space Center, has been awarded an "excellent" rating by the Small Business Administration for demonstrating "an exceptional small business program and accomplishments made beyond the call of duty." As a result of the rating, EG&G Florida is now a "Category A" company and will have to undergo SBA inspection every other year, rather than annually as normally required. This is the first such award to a company in the Southeast. ["SBA: EG&G 'Excellent'," FLORIDA TODAY, p. 18C, Feb. 12, 1987.]

February 12: SPACEPORT: BREVARD BOOTH

The Brevard County Tourist Development Council voted to upgrade the visitors information center booth at Spaceport USA by using \$82,500 in tourist tax revenues. The money would go to fund the salaries of three full-time employees and one part-time employee who work 364 days a year. In addition, more than \$26,000 was set aside to pay for video equipment and brochures touting Brevard County tourism.

Not included was an allotment for a sophisticated "phone bank" would allow tourists first to pinpoint, then contact specific motels, restaurants and attractions in the county through a "high-tech" apparatus at the visitors information center. Proposals for that service had been turned down by NASA officials, according to Joe Catrambone, executive vice president of the Titusville Area Chamber of Commerce. "They are very careful about what they do out there, so that no controversy is stirred up," he said.

However, NASA spokesman Arnold Richman said the agency is not opposed to such a system "as long as it would not be restricted to just chamber members. It should be informational, as opposed to advertising, and it should include everybody," he said, adding that such a system might tie up NASA's phone lines. [Bixler. FLORIDA TODAY, p. 9C, Feb. 13, 1987.]

<>

ADMINISTRATOR FLETCHER AT KSC

NASA Administrator James Fletcher, in his first visit to Kennedy Space Center since returning to head the agency, said that unless he were given very favorable odds he would not bet that NASA would meet its Feb. 18, 1988, target date to launch Discovery. He did say, however, that NASA was not backing off its goal. He acknowledged that NASA may be forced to push back the resumption of shuttle flights if any problems crop up during tests to recertify the shuttle's solid rocket boosters. At KSC, Fletcher noted that about 200 modifications must be implemented on Discovery before it lifts off. "There's a lot of threats to that [Feb. 18, 1988] schedule." [Halvorson. FLORIDA TODAY, p. 1A, Feb. 13, 1987.]

<>

JULES BERGMAN DEAD

Jules Bergman (ABC News science editor) died today of natural causes; he was 57. Bergman's was a familiar face at Kennedy Space Center, for he had covered every manned launch in U.S. space history. ["ABC Science Editor Bergman Dies at 57," FLORIDA TODAY, p. 3A, Feb. 13, 1987.]

February 14: McCartney Speaks to Executive Seminar

Kennedy Space Center Director Forrest McCartney will speak on three successive nights to executives of local aerospace firms during a three-day seminar beginning Feb. 17. Lt. Gen. McCartney will speak at the Crossway Inn (Cocoa Beach, FL) on the topic: "The Space Program: Where We Are and Where We Are Going." The seminar is sponsored by the Space Coast Council of the National Manager's Association. [Halvorson. FLORIDA TODAY, p. 3B, Feb. 15, 1987.]

February 17: Naval Ordnance Test Unit Honors

Eleven members of the Naval Ordnance Test Unit were honored at Port Canaveral's Poseidon Pier for their efforts in the Challenger recovery operation. Astronaut Robert Crippen, now deputy director of space shuttle operations, gave out the awards to the men who were commended for leadership, hard work and professionalism during the seven-month recovery operation. Crippen described that effort as the largest ever mounted in the United States. Thirty-three ships and Navy, Coast Guard and civilian personnel participated in the operation, Crippen remarked. [Higginbotham. FLORIDA TODAY, p. 1B, Feb. 18, 1987.]

<>

Rehiring Complete by Jan 1988: McCartney

"It is my best belief that all of the 2,000 who were laid off as a result of the [Challenger] accident certainly will be back by this time next year," Kennedy Space Center Director Forrest McCartney told a gathering of Brevard County officials at Spaceport USA. "By the end of the year, I think the work force will be close to where it was last year."

In other remarks, McCartney said that the Feb. 1988 target date for launching the space shuttle Discovery will not be

placed ahead of safety considerations. "We will fly again when we think it's safe to fly again. We will fly when we're ready to fly and not one minute before." Lt. Gen. McCartney acknowledged that any problems during NASA's efforts to recertify the solid rocket boosters could delay more shuttle missions, but asserted that the target can be achieved if no major problems occur during booster tests and no additional tests are added. "The 18th of February will be difficult to make, but I still feel we have the confidence that we can make it, unless we have some unforeseen problem...", McCartney said. [Halvorson. FLORIDA TODAY, p. 1A, Feb. 18, 1987.]

February 20: FRIENDSHIP 7 25TH ANNIVERSARY

The twenty-fifth anniversary of John Glenn's orbital flight around the Earth was celebrated today at Cape Canaveral Air Force Station. Test conductor for the Friendship 7 mission, Tom O'Malley, recalled his feelings of that morning: "It was the most petrifying moment in my life, wanting to make sure everything went right. As soon as the rocket cleared the tower, I had a sigh of relief. Then I was just hoping and praying the rest of the mission would turn out all right."

Speaking to the launch team members who had returned to Cape Canaveral for the commemoration was Dan Sarakon, base commander for General Dynamics Corp., which manufactured the Atlas 109D. "You were the first," he said, "You indeed were the pioneers. You indeed pushed back the space frontiers. You indeed were on the cutting edge." [Halvorson. FLORIDA TODAY, p. 1A, Feb. 21, 1987.]

February 23: CHALLENGER DEBRIS SEALED

Giant concrete caps sealed the abandoned missile silos where debris from the Challenger wreckage have been buried. "It's good to put this behind us," said Air Force Col. Edward O'Connor, head of the salvage operation. Parts of the solid rocket booster are still being studied and will be buried later. The silo caps can be removed by crane if any of the 235,480 pounds of debris is needed as evidence in lawsuits or for tests. ["Challenger Debris Is Sealed in Silos," USA TODAY, p. 3A, Feb. 24, 1987.]

<>

REDESIGNED SRB TESTED

A test of a redesigned solid rocket booster showed that O-rings in moderate temperatures prevented the escape of pressurized gases such as those that shot through a seal on Challenger on Jan. 28, 1986, said Morton Thiokol officials. "I think we're in good shape," said James McCluskey, program manager for the tests. "Our test showed that above 65 or 70 degrees, even the old O-rings would hold." ["Fourth SRB Test a Success," FLORIDA TODAY, p. 2A, Feb. 24, 1987.]

<>

STRIKE MAY CAUSE LAUNCH DELAY

A possible strike by McDonnell Douglas workers in California could cause a delay in the planned March 19 launch of an Indonesian communications satellite from Cape Canaveral Air Force Station said William Russell, manager of NASA's Delta rocket program. ["Strike Could Delay Launch," FLORIDA TODAY, p. 2A, Feb. 24, 1987.]

<>

RUNWAY SAFETY NETS CONSIDERED

Safety nets may be installed at the ends of at least six shuttle runways worldwide, according to NASA's John Tanner. Agency spokesman Jim Ball said it was not known whether the nets would be installed at Kennedy Space Center, but that they probably would be installed at alternate trans-Atlantic shuttle landing sites, such as Spain, Senegal and Morocco. ["Landing Strips May Get Nets," FLORIDA TODAY, p. 2A, Feb. 24, 1987.]

February 26: GOES-H LAUNCHED SUCCESSFULLY

NASA successfully launched a \$57 million GOES-H satellite aboard a Delta rocket from Launch Complex 17 at Cape Canaveral Air Force Station. Liftoff occurred at 6:05 p.m., with deployment taking place 31 minutes later. "It was a flawless countdown and a flawless flight," said NASA spokesman George Diller. The launch was the sixth consecutive success for the U. S. unmanned launch program. Barring unforeseen complications, the 885-pound Geostationary Operational Environmental Satellite [GOES] is expected to become operational March 26. [Halvorson and White. FLORIDA TODAY, p. 1A, Feb. 27, 1987.]

<>

DISCOVERY CREW AT KSC

The crew of NASA's next manned mission flew into Kennedy Space Center to greet workers preparing the Discovery for flight, currently slated for a Feb. 18, 1988, launch. "We're looking forward to talking to a lot of the folks here at KSC," said Frederick A. Hauck, commander. "It's a long year from now until the scheduled launch date, but I think it's important that we get out and chat with the folks here, so it's good to get back.

Hauck, along with astronauts Richard Covey, John Lounge, David Hilmer and George "Pinky" Nelson, landed on the Shuttle Landing Facility at 1:44 p.m. NASA spokesman Hugh Harris said the visit was part of an awareness program "that goes back to the beginning of manned spaceflight. The crew members historically have visited various centers that have been involved in the program and the manufacturing plants where the various hardware items are made." [Halvorson. FLORIDA TODAY, p. 6A, Feb. 27, 1987.]

MARCH

March 2: SOVIET DELEGATION TOURS KSC

A Soviet delegation - including 22 amateur boxers, six trainers and two interpreters - toured Kennedy Space Center for three hours. Their tour included stops at the shuttle landing facility, the crawler-transporter parking site, the Launch Control Center and pad A at Launch Complex 39. The Soviets also viewed "The Dream is Alive" at the Spaceport USA's IMAX Theatre. Journalists were not allowed to question members of the Soviet group. [Brown. FLORIDA TODAY, p. 1B, Mar. 3, 1987.]

March 5: FATAL AUTO ACCIDENT AT KSC

Anthony Pisco, 63, (Titusville, FL) was killed at Kennedy Space Center when the car he was driving collided with a van. The former senior engineer for Lockheed Space Operations was dead on arrival at Jess Parrish Memorial Hospital in Titusville, said NASA spokeswoman Lisa Malone. ["Collision at KSC Kills Engineer," THE ORLANDO SENTINEL, p. D-6, Mar. 6, 1987.]

<> BRITT'S AIR CONDITIONING CONTRACT

Kennedy Space Center awarded Britt's Air Conditioning, Inc. (Titusville, FL) a \$30,639 contract to install an air conditioning unit in the Thrust Vector Control Deservicing Facility located on the Cape Canaveral Air Force Station. [Boles. NASA/KSC News Release No. 38-87, Mar. 5, 1987.]

March 7: GLENN SPEAKS TO KSC HOMECOMING

U. S. Senator John Glenn, speaking to a "Homecoming" celebration at Kennedy Space Center's Spaceport USA, said that a robust space program is needed for the United States to remain the leading industrialized nation in the world. Glenn described space exploration as "not a sprint but a marathon."

"The space program," Glenn said, "is on the cutting edge of science and research. If this nation ever loses our leadership in technology, we've lost a good part of what has made this country go. Twenty-five years from now, I still

want us to be first on the cutting edge. That's the only way we can control our own destiny. Other speakers included former center director Richard Smith and U.S. Rep. Bill Nelson (D-Melb., FL). [Glisch. THE ORLANDO SENTINEL, p. A-10, Mar. 8, 1987.]

March 9: LOCKHEED SPC CONTRACT RETAINED

Lockheed Space Operations Co.'s shuttle processing contract will be retained and strengthened, according to NASA Administrator James Fletcher. The decision was made at the recommendation of a NASA study group which reviewed the shuttle processing contract.

"We view this [Fletcher's comments] as good news and as an endorsement of the SPC concept and Lockheed's performance on the contract," said Lockheed spokesman John Williams. Other recommendations of the study group stressed that oversight be tightened on Lockheed's operations and that as many as 400 more quality control workers be hired at Kennedy Space Center. [Halvorson. FLORIDA TODAY, p. 2A, Mar. 10, 1987, and Glisch. THE ORLANDO SENTINEL, pp. A-1 & A-4, Mar. 10, 1987.]

<> HORNER CITATION TO USBI

United Technologies USBI Booster Production Co. at Kennedy Space Center received the Horner Citation, an award given annually by United Technologies Corp. to units whose performance demonstrates team spirit on behalf of another unit. USBI was selected to receive the award because of its technical achievement in the Titan Recovery Program by providing assistance to UTC's Chemical Systems Division in California. ["USBI Receives Award," FLORIDA TODAY, p. 16C, Mar. 10, 1987.]

March 12: LOCKHEED AWARDED ADDITIONAL PROFIT

NASA awarded Lockheed Space Operations Co. additional profit of \$31.4 million for its first three years as the shuttle processing contractor. The incentive payment, based on Lockheed's performance in meeting target costs for work at Kennedy Space Center, was 75.6 percent of the potential \$41.5 million that could have been given, NASA spokesman Dick Young said. Dennis Diemoz, Lockheed's contract administrator, said the company was satisfied with the

results, especially in light of the experimental nature of the contract. [Hinman. THE ORLANDO SENTINEL, p. B-6, Mar. 13, 1987.]

<> UNIVERSITY OF FLORIDA CONTRACT

The University of Florida has been awarded a \$50,000 contract to organize a series of industrial seminars at Kennedy Space Center, according to NASA spokeswoman Diana Boles. The seminars are aimed at encouraging non-aerospace companies to get involved in the commercialization of space. No dates for the conferences have been announced. ["UF to Set Up NASA Seminars," FLORIDA TODAY, p.20C, Mar. 13, 1987.]

March 13: McCARTNEY ON SPC STUDY

"We are looking forward to see what changes, reinforcements, we should make that will lead us to improving (shuttle) processing, and, of course, achieving safer flight," said Kennedy Space Center Director Forrest McCartney during a meeting with journalists. In that meeting, McCartney addressed the conclusions of a recent study of Lockheed Space Operations Co.'s shuttle processing contract (SPC). [See related story for March 9.]

McCartney said changes are being made in five key areas to improve shuttle processing before the next manned mission currently scheduled for Feb. 18, 1988. "We found some good things and we found some things we think can be improved," said McCartney of the SPC study. The KSC director said that improvements to be made included:

- *Increasing the space center's engineering and quality control staff (by 200 to 325 workers). "I don't think we can ever have too much quality control," McCartney said. "In our business, we strive for a perfect situation and quality plays a very important role in that, and so does engineering. So we're going to beef that up some."

- *Improving documentation of shuttle processing. McCartney said the way that shuttle processing is documented "can be streamlined. We're going to have to look very carefully at the documentation that we receive" and that KSC contractors now "are re-establishing the specifications for how we handle the processing of hardware," he said.

*Recertifying workers and upgrading training. "We've been standing down for quite awhile and we are going to make sure the work force has the skill level that will allow us to be our very best," McCartney said. Maintenance instructions are being rewritten "to be sure the instructions are clear, concise and understandable," he said.

*Increasing involvement with developing contractors (Rockwell International, Morton Thiokol, and Martin Marietta, for example). "There's no question about it. I think everybody feels that we would be better by having more involvement with the development contractors. Close involvement by the development contractors is essential. It has been there and we will improve upon it," said McCartney.

*Building a better team concept. "We seem to have gotten to a point where we were moving equipment through, and people were more associated with (work) stations than specific hardware. We're going to see if we can't form teams that will follow the hardware from arrival to the pad." [Halvorson. FLORIDA TODAY, pp. 1A-2A, Mar. 14, 1987.]

<> LOCKHEED EMPLOYEE INJURED

Richard Caserta, 49-year-old Lockheed Space Operations Co. employee, was injured as Kennedy Space Center workers moved Atlantis from one high bay to another in the Vehicle Assembly Building, said Stuart Shadbolt, company spokesman. Caserta was struck on the left calf by a piece of plywood and was treated at the space center's occupational health facility.

Workers were moving Atlantis within the VAB so its solid rocket boosters and external tank could be removed from the orbiter March 19. The following day, workers will prepare Atlantis for the second post-Challenger flight, a classified military mission scheduled for May 26, 1988. Flight preparation will occur in the orbiter processing facility. "Next time we move Atlantis to the VAB, we'll be moving it there en route to the pad," said KSC Director Forrest McCartney. [Halvorson. FLORIDA TODAY, p. 8A, Mar. 14, 1987.]

March 16: SECURITY HEARINGS

Rep. Bill Nelson (D-Melbourne, FL) will hold hearings on Kennedy Space Center and Cape Canaveral Air Force Station

security, a Nelson aide said. The chairman of a House space subcommittee, Nelson's inquiry stems from security breaches earlier this year when anti-nuclear protesters penetrated the grounds at KSC and the Air Force Station. "We have not set a date or developed a list of witnesses yet," but the hearings will be held sometime this year, said Nelson aide David Dickerson. [Poole. FLORIDA TODAY, p. 6A, Mar. 17, 1987.]

March 18: REESER TO HEAD USBI

United Technologies Corp. announced the appointment of retired Air Force Col. Alvin L. Reeser (Melbourne, FL) to head a space-shuttle subsidiary, USBI-Booster Production Co. USBI, which refurbishes the forward and aft sections of the shuttle's solid rocket boosters, has 400 employees at Marshall Space Flight Center (Huntsville, AL) and 700 at Kennedy Space Center. Reeser, who retired in 1976, had been vice commander of the Space and Missile Test Center at Vandenberg AFB in California and held a number of management positions with Rockwell International. Before accepting his current position with USBI, Reeser had been an independent management consultant in Melbourne, FL. [Hinman. THE ORLANDO SENTINEL, p. C-1, Mar. 19, 1987.]

<> DAVIDSON SUES HANCHEY ESTATE

NASA employee Louis Davidson and his wife Paulette filed suit against EG&G and the personal representative of the estate of George T. Hanchey. The suit alleges that Hanchey caused the automobile accident which injured Davidson on Kennedy Space Center Feb. 7, 1986. The suit further alleges that an autopsy showed Hanchey's blood alcohol level was 0.11 at the time. The legal level of intoxication is 0.10. The suit also charges EG&G with negligence for failing to tell Hanchey not to drink before driving and seeks more than \$5000 in damages and a jury trial. [Johnson. FLORIDA TODAY, p. 3B, Mar. 19, 1987.]

March 20: INDONESIAN SATELLITE LAUNCHED

"This is a keeper. We'll take a launch like this any time," said NASA spokesman Jim Ball of the successful liftoff of a three-stage Delta carrying an Indonesian satellite. The launch of the \$43 million payload came at 5:22 p.m. from Cape Canaveral Air Force Station and was the second problem-free launch by NASA this year and allowed ground crews to

move ahead for the planned launch March 26 of a Centaur rocket set to carry a military communications satellite. [Glisch. THE ORLANDO SENTINEL, p. A-1, Mar. 21, 1987.]

March 25: ATLAS-CENTAUR READY FOR LAUNCH

Ground crews for the three-stage Atlas Centaur rocket scheduled for launch March 26 gave the \$78 million rocket a clean bill of health after engineers found a minute leak of highly refined kerosene fuel in the vehicle's main engines. The area surrounding the leak was x-rayed for possible hardware cracks and a fuel pressure test was run as an extra precaution before engineers decided the seepage was not serious. The rocket will carry a military communications satellite into orbit. [Glisch. THE ORLANDO SENTINEL, p. A-3, Mar. 26, 1987.]

March 26: ATLAS-CENTAUR DESTROYED IN RAINSTORM

An Atlas-Centaur booster carrying a military payload was destroyed by ground controllers 51 seconds after its launch in a rainstorm. Lost in the failure was an \$83 million military communications satellite which would have linked President Reagan with U. S. armed forces overseas. Range safety officers blew up the rocket when it had reached 14,520 feet and a half-mile south of the Cape Canaveral Air Force Station launch pad. The 4:22 p.m. launch had been delayed for 15 minutes because of the weather and was launched in a steady rain. NASA videotape clearly shows a lightning bolt striking land near the launch pad shortly after liftoff and agency officials confirmed lightning had been sighted five miles away during the countdown. An accident review board was constituted in the aftermath of the failure; one aim of the board is to determine whether the rocket should be retrieved from the ocean. NASA has not officially determined the cause of the accident and John Gibb, Atlas-Centaur project director, said that "there could be any number of things" which might have caused the failure and that he didn't want to speculate. [Halvorson and Moynihan. FLORIDA TODAY, pp. 1A -2A, Mar. 27, 1987.]

March 27: ATLAS-CENTAUR REVIEW BOARD

NASA began recovery operations of the Atlas-Centaur rocket destroyed after failure on March 26; at the same time the agency formed a nine-member review board to investigate the destruction of the \$78 million rocket and the military

communications satellite it carried. Named to head the board was Jon Busse, director of the Office of Flight Assurance at Goddard Space Flight Center in Greenbelt, MD.

Early indications were that the rocket may have been struck by lightning, causing it to tumble out of control just 51 seconds into its flight. Security patrols have already found several pieces of the rocket washed ashore at near a Kennedy Space Center launch pad. Brevard County police received no reports of debris along the shore.

Busse hopes for a rapid recovery effort saying, "I'd like to get all the hardware we can as quickly as we can...before it goes out further to sea and corrodes. We'll sit down and start piling through the data, looking for some clue to what the problem was. Then we'll come up with a most probable cause and recommend corrective actions." The board is due to report its findings May 25; that report may delay plans to launch an identical military communications satellite on June 11.

A local expert in atmospheric electricity - Rodney Bent (chairman of Atlantic Scientific Corp. in Melbourne, FL)- said his state-of-the-art lightning tracking computer plotted a cloud-to-ground strike at Cape Canaveral Air Force Station near the 4:22 p.m. launch. "There was a strike we recorded within about two minutes of the launch within about 300 yards of the launch pad," Bent said. Air Force officials confirmed a strike but placed it 1.9 miles north of the pad 46 seconds after launch.

Bent, who designed and patented the lightning tracking device, recently was awarded a \$1 million contract by the Department of Defense for 48 lightning monitoring receivers to cover the eastern half of the United States. He said that, while no strikes had been recorded prior to launch, "the whole area had significant electrical activity for most of the day as part of the leading edge of a tremendous lightning storm near Tampa." Bent said further, "There's no doubt about it. There was the distinct possibility of electrical activity, but it looked like to me it was clean" for launch.

Air Force spokeswoman Capt. Linda Leong said that a forecast given during a briefing just one minute and 45 seconds

before liftoff showed two bands of broken clouds in the sky over the launch pad. A second report describing weather conditions one minute after launch shows the clouds had descended quickly into the area above the launch pad. Although the rain clouds generated electrical activity in the atmosphere, no lightning strikes were reported within a five-mile radius of the pad. NASA's launch criteria forbid launching rockets when lightning comes within a five-mile radius of the pad. One strike had been recorded, however, just outside the radius - near the KSC Shuttle Landing Facility - at 4 p.m., some 22 minutes prior to liftoff. [Halvorson. FLORIDA TODAY, p. 1A, Mar. 28, 1987, and White and Halvorson. FLORIDA TODAY, pp. 1A-2A, Mar. 28, 1987.]

March 27: LAUNCH RULES REVISION

George Rodney, NASA safety chief, said the space agency will seriously consider revising its launch rules for unmanned spacecraft following the failure of a \$78 million Atlas Centaur rocket that might have been hit by lightning. "We are going to take a very hard look at the launch commit criteria," he said. [Glisch and Fisher. THE ORLANDO SENTINEL, pp. A-1 & A-6, Mar. 28, 1987.]

March 28: BUS DRIVER HAS HEART ATTACK

Stanley Kaye, 67-year-old tour bus driver Spaceport USA at Kennedy Space Center, collapsed while driving a double-decker passenger bus with about 100 persons on board. Kaye, (of Titusville, FL), suffered a heart attack at about 12:30 p.m. and was rushed to Jess Parrish Memorial Hospital (Titusville) and subsequently airlifted to an Orlando hospital where he was pronounced dead at 4:30 p.m., according to Harry Chambers, vice president and general manager of Spaceport USA. ["KSC Bus Driver Collapses, Later Dies," FLORIDA TODAY, p. 1B, Mar. 29, 1987.]

<> FEYNMAN ON WEATHER PREDICTION

"There's no doubt of the importance of accurately predicting the weather for launches at Kennedy," said Richard Feynman, former member of the presidential commission on the Challenger accident. "There is great difficulty in really predicting the weather at KSC - that was discussed a lot" by the commission, said Feynman.

In the two failed missions, Feynman said, "My impression is that both the (weather) predictions were pretty good, but it seems to be a given that at Kennedy it is very difficult to predict things any reasonable time ahead." In testimony before the Challenger commission, John Young, chief of NASA's Astronaut Office, advocated a conservative approach for KSC. "If you can't predict when a thunderstorm is going to arrive at the Cape, it is better to avoid that problem," Young said. Navy Capt. Robert Crippen, a veteran of four shuttle missions and now deputy director of shuttle operations, said the problems would persist.

"There are some things you could do to make Kennedy better," Crippen said, "but you're never going to overcome the weather unpredictability." [White. FLORIDA TODAY, p. 1A, Mar. 29, 1987.]

<> ATLAS-CENTAUR DEBRIS SEARCH

The search for debris from the destroyed Atlas-Centaur rocket has already been productive, according to NASA spokesman George Diller. Ships retrieved chunks of the rocket and the spacecraft payload, including some pieces floating within three miles of shore. Found so far are Atlas and Centaur propellant spheres, an Atlas liquid oxygen duct, a spacecraft radio transmitter and large and small pieces of the protective shell for the satellite, Diller said. Recovery ships Freedom, Liberty and Independence were involved in the search.

In other aspects of the investigation, Kennedy Space Center officials have impounded radio data, photographs and other evidence, including a videotape showing a lightning bolt darting from the area where the three-stage rocket disappeared in clouds shortly after liftoff. Launch officials reiterated that they based their decision to launch based on a report that there was no lightning within five miles of the launch pad or the rocket's projected path. [White. FLORIDA TODAY, p. 5A, Mar. 29, 1987.]

March 30: ATLAS-CENTAUR REVIEW FINDINGS

"I don't want to draw a conclusion, but there certainly is a strong indication of electro-magnetic phenomena associated with the failure of the Atlas-Centaur," said Jon Busse, head of a nine-member NASA panel investigating the March 26

incident. Busse also said that it appears that NASA didn't violate any launch restrictions.

Lightning strikes occurred in two locations about 16 minutes before liftoff. Busse said the rocket's ascent appears to have been normal, but less than a minute into flight, electrical activity near the pad increased significantly. "Between 48 and 53 seconds (into the flight), there was a lot of activity," he said. "There were four lightning strikes that occurred 1.9 miles (north) of the pad, occurring at 40 millisecond intervals, approximately."

During the same five-second period, Busse said there were "major changes" in the electrical systems of the rocket's nose fairing as well as its Atlas and Centaur stages. There were also "large current and voltage electrical transients (fluctuations) on both the Atlas and Centaur batteries," he said. Additionally, the rocket's main flight computer directed the booster engines to swivel, throwing the rocket off course. "We would very much like to know why that command was sent," Busse said. "There was no apparent reason why that command was sent."

Busse said preliminary (radar) evidence indicates that before the destruct signal was sent by range safety officials, the rocket began to break up. Highest priority in recovery operations will be the retrieval of the flight computer.

As a result of the rocket failure, Busse said the panel would "look very strongly at the weather criteria" for launches, adding that lightning constraints may have to be changed. Members of the House Committee on Science, Space and Technology who were visiting Kennedy Space Center also agreed that the rules might have to be altered. Committee chairman Rep. Robert Roe (D-NJ) said, "I would have recognized the problem we were facing and I would have said 'no'. I would have waited for another day." [Halvorson. FLORIDA TODAY, pp. 1A-2A, Mar. 31, 1987.]

March 31: HIGH WINDS DAMAGE KSC BUILDINGS

Gusts of wind reaching 52 mph caused more than \$20,000 damage to two buildings at Kennedy Space Center as record-breaking frigid temperatures chased rain and thunderstorms out of Florida. Part of the front of CBS network's

broadcasting building at KSC blew away Monday (March 30) night or this morning, and the neighboring ABC network building lost tiles and siding, said Diana Boles, KSC spokeswoman. [Higginbotham. FLORIDA TODAY, P. 1A, Apr. 1, 1987.]

<> FIRST KSC REVIEW BOARD MEETING

The board investigating the failure March 26 of an Atlas-Centaur rocket met for the first time at Kennedy Space Center. NASA spokesman George Diller said the meeting was organizational in nature. He added that the nine-member board would be dividing into groups later this week to pursue specific aspects of the investigation. No big finds were made in the recovery operations, Diller said, because rough seas hampered search efforts. ["Board Meets to Investigate Rocket Failure," FLORIDA TODAY, p. 5A, Apr. 1, 1987.]

<> SPACEPORT USA ATTENDANCE RECORD

For the sixth consecutive month, attendance records were broken at Kennedy Space Center's Spaceport USA. A total of 260,992 persons visited Florida's fourth-most-popular attraction during the month. ["Spaceport Breaks Visitor Record," FLORIDA TODAY, p. 16C, Apr. 2, 1987.]

APRIL

April 2: ATLAS-CENTAUR BOARD REVIEWS DATA

The NASA board investigating the March 26 failure of an unmanned Atlas-Centaur rocket finished reviewing impounded data today and also finished an examination of launch countdown procedures and post-launch flight data, said agency spokesman George Diller. He said the nine-member board will now split into groups and begin examining specific topics such as avionics, propulsion, salvage and weather. This review will last two weeks. The whole board will reconvene at Kennedy Space Center in mid-April to give status reports to board chairman Jon Busse. ["NASA Panel Begins Separate Probes Today," FLORIDA TODAY, P. 4A, Apr. 3, 1987.]

April 3: SPACE STATION APPROVAL BY REAGAN

President Reagan gave NASA permission to proceed with a scaled-down version of its planned space station that will cost an estimated \$10.9 billion, 36 percent more than originally planned in 1984. Under the revised plan, the space agency announced, the first space station component will be launched in mid-1994 by a space shuttle, and the modular base in orbit will be manned on a permanent basis with rotating crews beginning in early 1996, a delay of almost a year over the most recent plan. [UPI, "Space Station Gets 'Go'," THE ORLANDO SENTINEL, pp. A-1 & A-14, Apr. 4, 1987.]

<> LIGHTNING EVIDENCE

Burn marks and a small hole discovered in a piece of nose-cone debris from the March 26 Atlas-Centaur failure indicate the rocket almost certainly was struck by lightning, NASA officials revealed. Investigators have not yet confirmed whether lightning actually triggered the malfunction that forced the rocket's destruction. A pinhole-sized puncture in a three-foot-wide section of the rocket's nose-cone "has the appearance of a lightning burn," said Jon Busse, chief of the accident investigation panel. Busse cautioned that "this is not a conclusion," but the suspicion is sufficiently strong that the panel has asked for assistance from six experts in various aspects of

lighting behavior. [Fisher. THE ORLANDO SENTINEL, p. A-14, Apr. 4, 1987.]

April 6: LOCKHEED'S DICKENSEN RETIRES

Dave Dickensen, director of shops and processing contractors for Lockheed Space Operations Co., will retire May 1. He assumed the position in a change of top management personnel in 1985. Dickensen had worked for Lockheed for 33 years. Williams said Dickensen's successor has not yet been chosen. [Halvorson. FLORIDA TODAY, p. 4B, Apr. 7, 1987.]

<> DISCOVERY'S CABIN HATCH TO CALIFORNIA

Discovery's crew cabin hatch will be shipped to California this week where modifications can be made if NASA decides to install an escape system in the orbiter before its next flight (Feb. 18, 1988), said a Kennedy Space Center spokesman. "No irreversible modifications" would be made until a final decision to use an escape system on Discovery is made by senior NASA management later this year, according to KSC spokesman Jim Ball. NASA has said a "hatch jettison system would be installed in shuttles for future flights. ["Discovery Cabin to Be Sent to Calif.," FLORIDA TODAY, p. 4B, Apr. 7, 1987.]

April 7: FEB. 1988 LAUNCH SLIPPING

Richard Truly, head of the shuttle program for NASA told a House appropriations subcommittee that oversees NASA's spending that prospects for flying the space shuttle again by its target date of February 18, 1988, are getting "slimmer and slimmer." [Bumstead. FLORIDA TODAY, p. 6A, Apr. 8, 1987.]

<> EMERGENCY LANDING PROCEDURES TESTED

NASA astronauts were on hand at Kennedy Space Center to simulate procedures to be taken during emergency landings at the center's Shuttle Landing Facility (SLF). KSC spokesman Hugh Harris said the simulations were designed to "demonstrate procedures for post-launch contingencies" in the event the shuttle were to slide off the runway during landing. The astronauts practiced leaving a mockup orbiter with a new device designed to hasten their escapes. Improved Emergency Egress Breathing Devices, which would

ensure an adequate oxygen supply to astronauts during such an exit, were also tested said Harris. Astronauts who took part in the exercise were Frank Culbertson, Stephen Oswald, Kathryn Thornton, G. David Low, Jay Apt, Pierre Thuot and Carl Meade. ["Emergency Landing Simulated," FLORIDA TODAY, p. 6A, Apr. 8, 1987.]

April 8: MILITARY LAUNCH POSTPONED

NASA postponed a scheduled June 11 launch of a military communications satellite aboard an unmanned Atlas-Centaur rocket, said agency spokesman George Diller. The launch is being delayed until a board investigating the March 26 failure of an Atlas-Centaur rocket determines that operations at Cape Canaveral Air Force Station's Launch Complex 36 did not contribute to the accident. The report of the nine-member board is due May 25. [Halvorson. FLORIDA TODAY, p. 1A, Apr. 9, 1987.]

April 9: SIECK: TEST-FIRE DISCOVERY ENGINES

Discovery's main engines will undergo a test-firing if NASA accepts the recommendation of Kennedy Space Center's Launch Director Robert Sieck. The test could delay a planned Feb. 18, 1988, launch by a few weeks. Ordinarily, test-firings are only done prior to an orbiter's first flight and Discovery has flown six missions already. "We will have been (grounded) for two years and this will give the confidence to the management team that everything is back in order," Sieck said. "There's no question as a launch director it will make me feel much better having had (a test-firing) when we go into the final launch count" for the next launch, he said, adding that the test would be conducted by remote control with no astronauts aboard the shuttle. [Halvorson. FLORIDA TODAY, p. 1A, Apr. 10, 1987.]

<>

NEELY INTERVIEWS FOR ASTRONAUT CORPS

Cheryl Neely, aerospace engineer for McDonnell Douglas Astronautics Co. and a Cocoa Beach, FL, resident, has interviewed in Houston, TX, for a position with NASA's astronaut corp. "I guess perhaps the biggest quality is determination - do you have the drive to get where you want to go and are you willing to perform the job to the best of

your capabilities," said Neely. "I think I certainly have 'The Right Stuff'." Should she succeed in her efforts to become an astronaut, Neely would be the first Brevard space worker to join the elite astronaut corps. "I think my major qualification is my experience. I've worked not only with expendable vehicles (but also with) shuttle payload integration," she remarked. "If I don't make it, I'll update my application next year and try again." [Halvorsen. FLORIDA TODAY, p. 1A, Apr. 10, 1987.]

April 10: FLETCHER ON ATLAS-CENTAUR FAILURE

Referring to the March 26 Atlas-Centaur failure, NASA Administrator James Fletcher told Congress: "We're not going to fly another one in that kind of lightning atmosphere." Associate Administrator Richard Truly said, "I will assure you that weather criteria in the future for NASA's ELVs (expendable launch vehicles) will be more stringent." Senator William Proxmire (D-Wis.) asked why the launch from Cape Canaveral Air Force Station was not delayed till the weather cleared.

Truly explained that NASA launch criteria are less restrictive for expendable rockets than for shuttle flights. Fletcher added that the conditions during the Atlas-Centaur launch would have prompted cancellation of a shuttle flight. He continued, "The review hasn't been completed of the Atlas-Centaur failure. I think it is fair to say, though, we have had in the past - and may not have in the future - a different set of requirements for ELVs than we had for manned vehicles."

Continuous measurements of lightning potential are made around Kennedy Space Center, Fletcher said. "That data was available to the launch director. His criteria were if there's no lightning strikes within five miles of the launch site, it's safe to launch. That's much less stringent criteria than we apply to manned space vehicles. He then launched properly....We're not going to do it again." [Bumstead. FLORIDA TODAY, p. 1A, Apr. 11, 1987.]

<> GENERAL DYNAMICS SPACE SYSTEMS AGREEMENT

NASA announced the first signed agreement transferring commercial operations of an unmanned rocket to the private sector. The agreement, with General Dynamics Space Systems

Division for the Atlas-Centaur rocket, enables the company to use NASA-controlled facilities at Kennedy Space Center for commercial satellite launches. "We feel very good about it. It is a historic first," said General Dynamics spokesman Jack Isabel. "We'll launch as soon as we can sell them. If somebody came with a check in hand today, we could launch as soon as late 1989." The spokesman said employment at Kennedy Space Center would hardly be effected. NASA spokesman Jim Ball said, "We've been working very hard to bring these agreements into fruition. It clearly shows NASA's efforts to implement the president's policy to commercialize the expendable vehicle business." [White. FLORIDA TODAY, p. 8A, Apr. 11, 1987.]

April 14: PRACTICE COUNTDOWNS & FIRINGS COULD DELAY LAUNCH

Proposed practice countdowns and main engine test-firings could delay Discovery's launch next year from February till as late as September, according to reports in the current issue of AVIATION WEEK & SPACE TECHNOLOGY. That schedule estimate is based on adding the unscheduled tests and the amount of time needed to process Discovery for flight. [Halvorson. FLORIDA TODAY, p. 7A, Apr. 15, 1987.]

April 15: YOUNG MADE SPECIAL ASSISTANT TO JSC DIRECTOR

John Young, NASA's chief astronaut, was named a special assistant to the Johnson Space Center director for engineering, operations and safety. Young also will be eligible to command future shuttle crews. [Halvorson. FLORIDA TODAY, p. 6A, Apr. 16, 1987.]

April 16: ATLAS-CENTAUR HIT NINE TIMES BY LIGHTNING

The Atlas Centaur that failed March 26, was hit nine times by lightning shortly after launch. NASA today displayed pieces of crumpled wreckage from the \$78 million rocket which had suffered a main computer malfunction and was destroyed by range safety officers. The disclosure suggests a possible breakdown of communication between Air Force meteorologists and NASA launch officials directors. The findings of the accident review panel will be announced May 25. [Glisch. THE ORLANDO SENTINEL, p. A-1, Apr. 17, 1987.]

<> ATLAS-CENTAUR COMPUTER MALFUNCTIONED

A flight computer that malfunctioned and caused an Atlas Centaur rocket to veer off course during the March 26 failure was recovered from the Atlantic Ocean today, NASA said. The discovery brought to a halt the three-week old salvage operation. "This was the most important item remaining to be recovered from the standpoint of the board (investigating the failure)," said Jim Ball, NASA spokesman. The computer was found just off the coast of Cape Canaveral. [Halvorson. FLORIDA TODAY, p. 6A, Apr. 17, 1987.]

<> ASTROTECH FACILITY FOR SALE

The Astrotech Space Operations facility (Titusville, FL)- the only commercial satellite processing plant in the country - has no work booked for the next 18 months and is up for sale, according to an attorney for Astrotech International - the Pennsylvania-based parent company of Astrotech Space Operations. "The discussions are proceeding very slowly, and there have been no serious negotiations so far," said Ray Royko. [Halvorson. FLORIDA TODAY, p. 6A, Apr. 17, 1987.]

April 21: TRULY: FEB. LAUNCH IMPOSSIBLE

Admiral Richard Truly said in Washington that Discovery cannot be launched by Feb. 18, 1988, and that the earliest possible date is April 1 of next year. Truly, head of NASA's manned spaceflight program, said that a new date has not been officially set. Shuttle program director Arnold Aldrich, speaking to an opening session of the annual Space Congress in Cocoa Beach, said that "I'd have to say that around April 1 is the earliest we can fly. But we're still assessing other dates."

NASA must still conduct tests of the shuttle's redesigned solid rocket boosters and a flight readiness firing. Discovery will be bolted onto the pad during the 20-second test, which will be conducted by remote control with no astronauts aboard in February 1988, said Aldrich. Kennedy Space Center officials said they are far behind in work that needs to be done to prepare Discovery for flight and that process could take until September 1988 to finish. [Glisch. THE ORLANDO SENTINEL, pp. A-1 & A-4, Apr. 22, 1987.]

<> NELSON: SPACE CONGRESS KEYNOTER

Rep. Bill Nelson (D-Melb., FL), in his keynote address to the 24th annual Space Congress, said that a manned mission to Mars in the next century would enable America to retain its world leadership in space. He said that the mission would energize the country's economy and create thousands of jobs. ["Nelson: U.S. Needs Mars Mission to Stay Ahead," FLORIDA TODAY, p. 2B, Apr. 22, 1987.]

<> PRIVATE SECTOR LAUNCH PLANS

Down payments for nine commercial launches have been received by each of two companies, officials from Martin Marietta and McDonnell Douglas Astronautics Co. said today. The private launches would take place at Cape Canaveral Air Force Station between late 1988 and the end of the decade. ["Private Sector Launches Plan," FLORIDA TODAY, p. 2B, Apr. 22, 1987.]

<> DALE MYERS ADDRESS SPACE CONGRESS

NASA's future lies in the merging of the space program and the private sector through commercial use of a manned space station and unmanned rockets, said Dale Myers, Deputy administrator at NASA. Speaking to an early session of the 24th annual Space Congress, Myers said: "It is vital both that space technology be made available to the private sector to stimulate the economy...and also to unleash the creative talent and energies of the free enterprise system in the space area." [White. FLORIDA TODAY, p. 2B, Apr. 22, 1987.]

<> SPACE CONGRESS ACHIEVEMENT AWARD TO O'CONNOR

The Space Congress's Achievement Award was given to Col. Edward O'Connor, who led efforts to locate and recover debris from the Challenger. O'Connor said that he knew three of the seven crew members and that bringing up the crew cabin was the toughest part of the recovery mission. [White. FLORIDA TODAY, p. 2B, Apr. 22, 1987.]

April 22: STATION PROGRAM DIRECTOR ADDRESS

"We hope that before the end of the week, we'll have the RFPs (requests for proposals) out," Space Station Program

Director Andrew Stofan told a thousand people attending the 24th annual Space Congress in Cocoa Beach, FL.

Stofan said the first phase - to begin in 1994 - is expected to cost \$14 billion. [Requests for proposals were announced by NASA on April 24.] The second phase would cost an additional \$3 billion to \$4 billion.

Phase one would include construction of the manned orbiting laboratory's main truss, U.S. laboratory and habitation modules, an unmanned orbiting platform, lab modules (being built by ESA and Japan), and part of a Canadian mobile servicing system. Phase two would include an upgraded power system, the remainder of the Canadian system, upper and lower booms for the station and an adjoining research lab.

The status of developing technologies required to meet space station goals were detailed by James Johnson, deputy manager of the Space Station Project Office at Kennedy Space Center. Outlining the complexities of station operations and its uses in retrieving and repairing ailing satellites were Donald Molgaard (TRW) and Gordon Rysavy, Satellite Service Project Engineer at Johnson Space Center. [Halvorson. FLORIDA TODAY, p. 1B, Apr. 23, 1987 & Hess. NASA/KSC NEWS RELEASE NO. 87-65, Apr. 24, 1987.]

<>

CRIPPEN ADDRESSES SPACE CONG.

Robert Crippen, deputy director of space shuttle operations and shuttle veteran, told the 24th annual Space Congress that before NASA can progress to other goals and projects, the shuttle must fly again. He said a new launch date for Discovery (to replace Feb. 18, 1988) will be arrived at cautiously and after Discovery undergoes a countdown demonstration test and a test-firing of its main engines. [Halvorson. FLORIDA TODAY, p. 3B, Apr. 23, 1987.]

April 23: ASTRONAUT HILMERS ADDRESSES SPACE CONG.

"I think the future of our space program, as well as our country, lies with young people. Talking to them is a real significant part of the job of being an astronaut," said shuttle astronaut David Hilmers to the guests of honor at the 24th Space Congress Science Fair awards presentation in Cocoa Beach, FL. "During this stand-down period, one thing that is really going to be important - and something we astronauts can play a big part in - is keeping the young people's interest in space science," Hilmers added.

Receiving awards were first-place winners: Kathleen Washburn (Melbourne High School); Paul Schroeder (Rockledge High School); Morrissa Netcher (Central Junior High School); and Clifford Wang (Vero Beach Junior High). [White. FLORIDA TODAY, p.1B, Apr. 24, 1987.]

<> SECOND GENERATION SHUTTLE

Dr. Gerald Walberg, chief of Space Systems Division at NASA's Langley Research Center (Hampton, VA), told the Space Congress that a second generation space shuttle will take lessons from the past to help America regain leadership in space. "I believe if the nation does aggressively pursue programs to develop new technologies then we stand a very good chance of...the United States recapturing world leadership in space transportation."

Walberg told Space Congress participants that initial designs show the shuttle of the next century to be roughly half the weight of the current shuttle; it would have a 106-foot booster with wings so it can glide back 220 miles after detaching from the 138-foot orbiter to land near processing facilities; there would be launches from both KSC and Vandenberg Air Force Base totalling up to 29 per year; the launch turnaround goal would be 10 days; the shuttle would have a large detachable module on its back that could be specialized for each mission and could carry up to 18 passengers; and the shuttle would be able to carry a Space Taxi and Rescue (STAR) vehicle, first designed as a lifeboat for the space station and for other on-orbit reconnaissance and other purposes. [White. FLORIDA TODAY, p. 6B, Apr. 24, 1987.]

April 27: SPACE BIOLOGY PROGRAM GRANT

Kennedy Space Center renewed a grant to Washington State University valued at \$45,000 to investigate how calcium is affected during plant growth in space. The effort is funded under the Space Biology Program, which is part of a life sciences program that studies the way living systems, such as plants and animals respond to gravity. The space center is managing eight of the many grants in the agency-wide Space Biology Program. [Boles. NASA NEWS/KSC RELEASE NO. 52-87, Apr. 27, 1987.]

April 28: ATLAS CENTAUR COMPUTER STRUCK BY LIGHTNING.

NASA announced that tests on the Atlas Centaur's main computer have proved that lightning caused it to malfunction shortly after liftoff on March 26. The rocket was 48

seconds into flight when it was hit nine times by lightning which jolted the computer and caused it to send a wrong command to the main engines, said Jon Busse, head of the investigation of the failure. ["Flight Computer Shows Lightning Downed Atlas," THE ORLANDO SENTINEL, p. A-7, Apr. 29, 1987.]

April 30: SPACEPORT USA APRIL ATTENDANCE

April attendance at Spaceport USA rose 28.8 percent from the same month in 1986. The Kennedy Space Center attraction rose from 193,297 in 1986 to 249,049 this month. Officials attribute the substantial increase to the Easter holiday, which fell in April this year and in March last year. TW Recreational Services Inc., operator of the attraction, said attendance for the first four months of the year is up 12 percent from the same period a year earlier. ["Spaceport USA," THE ORLANDO SENTINEL, p. 1B, May 2, 1987.]

MAY

May 3: LAUNCH DELAY

NASA is expected to announce this week that the next shuttle launch won't come until late spring or summer of 1988. The delay will permit one or more extra full-scale rocket booster test firings before launches resume, a significant safety issue among monitors of the shuttle rehabilitation. The new delay "will be closer to a six to eight week delay than it will be a late summer" or early fall launch, said shuttle program chief Arnold Aldrich. Launch Director Bob Sieck at Kennedy Space Center said that because much of the testing would involve the shuttle on the pad, workers would still be under deadline pressure in the coming months. [Fisher. THE ORLANDO SENTINEL, p. A-6, May 4, 1987.]

<> OPEN HOUSE

Kennedy Space Center Director Forrest McCartney said the "Open House" celebrating the center's 25th anniversary helps introduce KSC workers' families to their other "family"-co-workers at the center. "Whether it's the male or female of the family, if the spouse works there, the rest of the family wants to know about it. It's great. It's what it's all about," Lt. Gen. McCartney said.

"Being able to walk through the Vehicle Assembly Building and see the External Tanks and Columbia...think about how impressive that must be to the children who are here today," McCartney remarked. "It's got to be impressive for them to know that those objects have been in space and back several times. It's a great day. The weather is good, the crowds are enthusiastic. This is exactly what we should do."

Speaking of the two-day event and the 40,000 persons expected to attend, Darleen Hunt, NASA chairwoman of the 25th anniversary celebration said, "It's a great employee morale lift to be able to bring their families out and share the pride they have in the place that they work and the things they do at their job. This open house," Hunt continued, "will definitely be the highlight of the celebration because we're getting to more people than any other thing this year." [White. FLORIDA TODAY, p. 1B, May 3, 1987.]

May 4: CRIPPEN COMES TO KSC

Navy Capt. Robert L. Crippen will report to Kennedy Space Center shortly as assistant director for operations. He works for Arnold Aldrich, director of NASA's Space Transportation Program office.

Thomas E. Utsman, director of Space Transportation System Management and Dep. Dir. of Kennedy Space Center, said at the 24th Space Congress that the center is moving toward a September checkout of the Discovery. To date, he said, 57 of 115 scheduled orbiter modifications have been completed and four of 45 ground system modifications are finished, with another 21 under way. [Kolcum. Aviation Week & Space Technology, pp. 77 & 79, May 4, 1987.]

May 8: LAUNCH PROCESSES REVIEW

NASA named a team to conduct a major review of the decision-making process for launching both manned and unmanned rockets and space shuttles. Shuttle program deputy director Robert Crippen will co-chair the panel along with Joseph Mahon, NASA's deputy associate administrator for space flight. Other panel members include Jay Greene, flight director at Johnson Space Center; Gene Thomas, director of safety, reliability and quality assurance at Kennedy Space Center; Charles Gay, director of shuttle operations at KSC; and William Russell, project manager for the Delta rocket program at Goddard Space Flight Center.

The review "will include, but not be limited to, launch constraints and weather criteria," said a NASA spokesman. The review is to be completed by July 3. Changes already instituted include new weather constraints and a strengthened communication system for launch team members. [Glisch. THE ORLANDO SENTINEL, p. A-6, May 9, 1987, and Halvorson. FLORIDA TODAY, p. 1B, May 9, 1987.]

May 11: ATLAS ACCIDENT PANEL REPORT

"The Air Force missed the call on the weather and NASA was not able to recognize the error," said John Busse, head of the Atlas accident board. "No one stood up and said, 'Don't launch.'" Busse, director of Safety at Goddard Space Flight Center, made the remarks in Washington while delivering the Atlas report to Admiral Richard Truly, chief of manned space flight. Kennedy Space Center employees heard Busse via satellite.

"The most probable cause of the mission failure was launching the vehicle into atmospheric conditions conducive to triggering lightning," Busse remarked. The launch violated "established criteria used to avoid potential electrical hazards, namely lightning," he said. "If (NASA managers) had followed existing criteria rigorously, they wouldn't have launched."

Air Force meteorologists gave approval for launch four minutes prior to engine firing, Busse said. That go-ahead was given despite data that showed "a significant number of indications throughout the day that the weather was unfavorable, and specifically, that there was a lightning hazard. The real import of these indications escaped the launch team because of imprecise communications, lack of awareness, or both," Busse said.

Busse said a single lightning flash, triggered by the rocket's launch, caused the loss of the \$78 million rocket and its \$83 million payload. The rocket was subsequently hit by four strikes caused by the flash. The strikes provoked a voltage surge that caused the rocket's flight computer to falsely command the booster to change its flight path. That command sent the rocket out of control 50 seconds into flight, and the booster then began to break apart. [Glisch. THE ORLANDO SENTINEL, pp. A-1 & A-6, May 12, 1987, and Halvorson. FLORIDA TODAY, p. A-1, May 12, 1987.]

May 14: ATLAS ACCIDENT "WARNING FLAGS"

Atlas Accident Panel Chairman Jon Busse outlined several "clear warning flags" that should have stopped the launching of the Atlas Centaur mission which failed March 26:

- *Officials did not have accurate reports about cloud conditions and the potential for lightning to strike because the Air Force plane usually employed for weather reconnaissance was grounded by bad weather in Tampa, FL.

- *Several of the weather balloons sent up in the plane's absence did not reach their destination, and investigators think some exploded because of unusually cold conditions in the clouds and that these conditions exceeded NASA's launching guidelines.

- *Despite conversations throughout the day concerning nearby thunderstorms, NASA's mission director did not look at measurements taken from 21 sites around the launching pad

indicating the electrical potential of the atmosphere. Air Force weather personnel did monitor the data, but apparently did not notice that it exceeded, by four to eight times, the maximum allowable electrical potential for launching a space shuttle; the criteria for launching unmanned missions are not as restrictive as for manned missions.

James Womack, launch director on March 26 and the senior NASA official on hand for the Atlas Centaur launch, said that the launch had absolutely been a mistake, adding that he and his staff had thought they were "within the criteria, that it was safe to launch. When you have so many green lights, it is hard to get to another conclusion," said Womack. [Sanger. THE NEW YORK TIMES, p. 8, national edition, May 15, 1987.]

May 15: NASA TO CONTRACT ELV'S

NASA plans to open competition in 1988 for multi-year contracts covering the launch of unmanned NASA missions beyond 1991, according to Administrator James Fletcher. "A major objective of this plan is to accelerate the deployment of the nation's backlog of space science missions" and to "lessen dependence on the space shuttle," he said. "Expendable launch vehicles [ELV's] will help assure access to space, add flexibility to the space program, and free the shuttle for manned scientific, shuttle-unique and important national security missions," Fletcher said.

Kennedy Space Center spokesman Hugh Harris said the policy was a major departure from the one NASA has used since the late 1950's. "Instead of preparing and launching the rockets ourselves, we will be hiring a company to do it for us," he said. [Halvorson. FLORIDA TODAY, pp. 1A-2A, May 16, 1987.]

May 17: THIOKOL EMPLOYEES FACE DRUG TESTS

Employees of Morton Thiokol Inc. at Kennedy Space Center will be tested for drug use today at Wuesthoff Hospital's Center for Health Awareness in Port St. John [FL] and the urine samples will be sent Utah for analysis. For the time being only employees involved in the shuttle program will be tested by Thiokol; eventually all 400 - including management and secretaries - will be tested. Currently two other KSC contractors test for drug use: USBI Booster Production Co. and Boeing Space Operations Co. [Nagy. FLORIDA TODAY, p. 1A, May 18, 1987.]

May 19: MCCARTNEY AWARDED ASTRONAUTICS TROPHY

Kennedy Space Center Director Lt. Gen. Forrest McCartney will be awarded the 1987 Military Astronautics Trophy by the American Astronautical Society at the group's sixth annual Classified Military Space Symposium May 27 in Washington, D.C. ["KSC Director Lauded for Leadership," FLORIDA TODAY, p. 2B, May 20, 1987.]

May 20: NEXT LAUNCH: JUNE 1988

NASA formally set a June 1988 launch date for the first post-Challenger flight, adding an extra four months delay to accommodate extensive shuttle changes. A full-size booster test firing is set for May 27. NASA Deputy Administrator Dale Myers conceded that if problems show up during the test firings of the new boosters set to begin in August, the newly announced schedule could suffer. [Fisher. THE ORLANDO SENTINEL, p. A-1, May 21, 1987.]

<> 1988 FLIGHTS CUT FROM FIVE TO THREE

NASA announced plans to cut its 1988 flight schedule from five to three and from eight to seven for 1989 and said that the new schedule should not affect plans to continue the recall of Kennedy Space Center workers who were laid off following the Challenger accident.

"We would not expect that today's announcement would have an appreciable impact on our present personnel build-up plans," said John Williams, spokesman for SPC contractor Lockheed Space Operations Co. The SPC workforce is expected to rise from its present 5,600 to 5,700 by the end of May and to 6,000 by the end of September, said Williams. Tentative plans call for employment to rise to 6,800 by May, 1988, he said, adding that 6,300 were employed under the contract at the time of the Challenger accident.

NASA's associate administrator for space flight, Rear Admiral Richard Truly, said that a tracking and data relay satellite (TDRS) will be the first shuttle payload. [Halvorson. FLORIDA TODAY, pp. 1A-2A, May 21, 1987.]

May 22: HOLLOWAY CORPORATION CONTRACT AWARD

Kennedy Space Center awarded Holloway Corporation (Titusville, FL) a \$355,1149 contract for construction of the Spaceflight Tracking and Data Network (STDN) Facility Support Services Building to be located just west of

Spaceport USA. The building will house computer equipment, office space and small shops to support the Goddard S-Band Tracking Data Network Station and will provide air-to-ground voice and data communication for launch and landing of the shuttle. The tracking station is also responsible for tracking earth orbiting space science satellites. The contract is one set aside for award to a small business. [Boles. NASA/KSC NEWS RELEASE NO. 59-87, May 22, 1987.]

<> DENNIS L. SMITH, INC. CONTRACT AWARD

Dennis L. Smith, Inc. (Vero Beach, FL), a small business firm, was awarded a \$353,616 contract by Kennedy Space Center to repair a 7.5 mile section of westbound lanes on NASA Causeway, starting at the Kennedy Parkway (State Road 3) and extending to Gate #3 near U. S. Highway 1. [Boles. NASA/KSC NEWS RELEASE NO. 58-87, May 22, 1987.]

May 24: OIL LEASES IN NASA FLIGHT ZONE

The U.S. Department of Interior has again put on a list of potential oil drilling sites an area off Brevard County which included NASA's flight clearance zone. U.S. Rep. Bill Nelson (D-Melb., FL) said, "We'll fight this at whatever level we have to." Susan Hall, a spokeswoman with Interior's Minerals Management Service in Washington, D.C., said the land had been included in the five-year program because the oil industry had shown a "high interest in it. There's no reason to prematurely and arbitrarily write off acreage that may be leasable if something can be worked out," she said. "But what is important to understand is that this program is simply a planning guide. Nothing has been leased; nothing has been set in stone. I think that the parties that are reacting as though this is the final word are missing the point." [Sellers. THE ORLANDO SENTINEL, p. B-1, May 25, 1987.]

May 26: LOST WRENCH FOUND IN DISCOVERY

A six-inch wrench lost inside the Discovery nearly three years and six missions ago was recovered by an unidentified woman with "long and slender arms," said a NASA spokesman today. The one-ounce tool was discovered May 21 during a routine preflight metals stress tests using X-rays, said NASA spokesman Dick Young. "It was apparently in a tight spot in one of the forward compartments," he said. "They tried several ways to get at it, but nothing worked until they found a gal who was described as having long and slender arms. She apparently was able to grab it."

Young said Rockwell International notified NASA in 1984 that the wrench was lost during construction at its Palmdale, CA, plant. NASA officials ruled out the possibility of any foul play or mischief, he said. NASA spokesman Charles Redmond III said "because the item was so small, so light, they decided there was no concern," and NASA agreed. Young said the orbiter made six flights with the lost wrench aboard from Aug. 1984 to Aug. 1985. Currently, Discovery is undergoing tests to prepare it for a June 1988 launch date. [A.P., FLORIDA TODAY, p. 1B, May 27, 1987.]

May 27: SRB TEST SUCCESS

A two-minute test of a shuttle booster occurred without problems and with no evidence of the type of leakage that led to the Challenger disaster. John Thomas, director of NASA's solid-rocket design team, said the success of this test, which took place at Brigham City, Utah, might enable the Discovery flight to be moved up by two or three days. ["Test Firing of Shuttle Booster A Success," FLORIDA TODAY, p. 6A, May 28, 1987.]

May 28: MARTINEZ FORMS SPACE INDUSTRY COMMISSION

Florida Governor Bob Martinez signed an executive order creating the Florida Governor's Commission on Space during a joint meeting of the NASA-Kennedy Management Association and the East Central Florida Space Business Roundtable at Spaceport USA. The commission is intended to complete a comprehensive report on the current status and future prospects of the aerospace industry in Florida, including recommendations on how Florida can attract more aerospace related firms and investment. Members of the commission, who will be named at a later date, will be asked to deliver the report by June 1, 1988. An interim report on space-related legislative issues will be due March 1, 1988. The Dept. of Commerce, headed by Secretary Jeb Bush, has set aside \$100,000 for commission projects. [Halvorson. FLORIDA TODAY, p. 1A, May 29, 1987.]

May 29: COSTELLO CONSTRUCTION CO. CONTRACT

Kennedy Space Center awarded a \$183,000 contract to Costello Construction Company (Merritt Island, FL) to install new gaskets on approximately 300 windows overlooking the firing rooms at the Launch Control Center, Complex 39. The fixed-price contract is one set aside for awarding to a small business. [Boles. NASA/KSC NEWS RELEASE NO. 63-87, May 29, 1987.]

May 31: SPACEPORT USA ATTENDANCE

Attendance at Spaceport USA reached record heights in May as an estimated 176,000 people visited the tourist facility. The May attendance figure marks the ninth consecutive month that monthly visitor records have been surpassed and the eleventh time in the past twelve months. [Varnes. NASA/KSC NEWS RELEASE NO. 64-87, June 1, 1987.]

JUNE

June 1: TRULY ANNOUNCES LAUNCH DATE

Discovery will lift off one year from today, if current plans stay on schedule, said NASA Associate Administrator Richard Truly in Jackson, Mississippi. Speaking to a homestate Rotary luncheon, Admiral Truly said: "This will signal the recovery of a highly complex space transportation system." Referring to the next full-scale testing of the solid rocket motor to take place around Aug. 1, Truly said: "We want to see it tested several times. By the time we get to the end of the testing, we will have full confidence in the system. Today we are putting an emphasis on operations, management and a major emphasis on safety, reliability and quality." Speaking of the confidence he'd have in the safety of the next shuttle mission, Truly remarked, "I'd put my grandmother on that flight." ["Shuttle Shot Just Year Away," FLORIDA TODAY, p. 1A, June 2, 1987, and "Launch Date Depends on Future Tests," FLORIDA TODAY, p. 6A, June 2, 1987.]

<> OFFICE OF EXPLORATION CREATED

NASA has organized its ongoing studies of future manned flights to the moon and Mars under a new Office of Exploration which will be headed on an interim basis by retiring astronaut Sally Ride. According to Administrator James Fletcher, the new office "will analyze and define missions proposed to achieve the goal of human expansion off the planet." [Fisher. THE ORLANDO SENTINEL, p. A-3, June 2, 1987.]

June 2: ASTRONAUTS TEST PAD ESCAPE

The seven astronauts who practiced escape from Atlantis in November 1986 have just completed two days of similar exercises at Kennedy Space Center. The drills this time involved nighttime evacuation of the crew from the LC 39B "white room." Jim Ball, NASA spokesman said, "Everything went well; we didn't have any problems at all." Astronauts participating in the exercise were: Commander Frank Culbertson; pilot Stephan Oswald; mission specialists Carl Meade, Kathryn Thornton and G. David Low; and payload specialists Pierre Thuot and Jerome Apt. [Halvorson. FLORIDA TODAY, p. 9A, June 3, 1987.]

<> TESTS OF SHUTTLE STOPPING NET

NASA is studying the possibility of using a huge nylon net to stop shuttles during emergency landings at Kennedy Space Center and other landing sites such as Edwards Air Force Base in California and several trans-Atlantic sites. [Halvorson. FLORIDA TODAY, p. 9A, June 3, 1987.]

June 4: OIL LEASES IN NASA ZONE BLOCKED

A House appropriations subcommittee told the U. S. Interior Department to remove all offshore oil drilling tracts between the Georgia-Florida line and Melbourne, FL, from its five-year program or it would impose a moratorium on its rights to lease the land. The area, which lies within the Eastern Space and Missile Center zone, is considered too dangerous for drilling because missiles and the space shuttle solid rocket boosters can fall there during launches. That would impose dangers to rigs and rig workers. [Lancaster. THE ORLANDO SENTINEL, p. B-1, June 5, 1987.]

<> NASA TO BUILD BEACH ROAD

Congress approved \$6.6 million to build an alternate entrance to Playalinda Beach that isn't within the area that NASA secures for launches, said a spokesman Rep. Bill Nelson (D-Melb., FL). The National Park Service will award a contract to construct the road in late 1988. Construction will take about two years, said David Dickerson, spokesman for the congressman. ["NASA To Build Road To Keep Beach Open," THE ORLANDO SENTINEL, p. B-2, June 5, 1987.]

June 5: BREVARDIAN CHOSEN ASTRONAUT

Jan Dozier, who was born at Patrick Air Force Base in Brevard County and who works now as an aerospace engineer at Marshall Space Flight Center in Huntsville, Alabama, has been chosen to become a shuttle mission specialist. She was one of two women selected; the other was Mae Jemison, a California physician who will become the first Black woman to enter the astronaut ranks. [Halvorson. FLORIDA TODAY, p. 2A, June 6, 1987.]

June 9: BALL TO LEAVE KSC

Jim Ball, who has worked for public affairs at Kennedy Space Center for the past five years, has accepted a transfer to NASA headquarters in Washington, D.C. He will resign his

seat on the Titusville (FL) City Council, effective July 1. The new job in Washington will include work for NASA's Office of Commercial Programs and the newly created Office of Safety. ["Ball Will Leave Titusville Council," FLORIDA TODAY, p. 1B, June 10, 1987.]

June 11: ATLAS CENTAUR ANNIVERSARY

The 25th anniversary of the first Atlas launch (May 8, 1962) was celebrated today by 280 past and present members of the General Dynamics launch team which launched the world's first hydrogen-fueled space vehicle. The gathering took place at Patrick Air Force Base where the group was addressed by Kennedy Space Center Director Lt. Gen. Forrest McCartney. He told the team that their efforts made America preeminent in space exploration.

"The Atlas-Centaur for several decades now has been the mainstay and backbone of not only the effort to keep our country free, but also our efforts to become recognized as the world's leader in space," McCartney said. Acting director of unmanned launches, James Womack, said "The Atlas and the Centaur certainly have made a name for themselves over the past 30 years." ["Atlas Team Celebrates First Launch," FLORIDA TODAY, p. 2B, June 12, 1987.]

June 13: LOCKHEED TO REHIRE 1300

Lockheed Space Operations Co. chairman Lawrence Kitchen announced that its work force - currently at about 5600 persons - should reach 6,900 by Discovery's June 1, 1988 launch date. Kitchen was in Melbourne to speak at Florida Institute of Technology's commencement. "Our people were down for a long time," Kitchen said. "They're back working at the problems. I think it's all coming back, they're getting over the shock and the letdown" following Challenger, he said. [Horgan. FLORIDA TODAY, p. 1B, June 14, 1987.]

June 14: GENERAL DYNAMICS LAUNCH TEAM

The expected announcement by General Dynamics of plans to build an additional 18 Atlas-Centaur rockets will mean that the company can keep its 300-member launch team at Cape Canaveral Air Force Station intact, according to Jack Isabel, corporate spokesman. "I think we'll be in a very stable condition as far as the launch team is concerned. I wouldn't anticipate an increase in the work force, but we'll be able to retain the launch team," he said.

Lee Scherer, director of commercial space programs for General Dynamics and former director of KSC, said the new rockets should be available for launch between 1989 and 1992. He said that his company is offering a guaranteed relaunch at no additional cost in the event of a launch failure. [Halvorson. FLORIDA TODAY, p. 2B, June 15, 1987.]

June 15: CHATTECX CORPORATION CONTRACT AWARD

Kennedy Space Center awarded Chattecx Corporation (Chattanooga, TN) a \$37,000 contract for a muscle function testing machine to be used by the center's Biomedical Operations and Research Office in conducting ground-base studies on the prevention of muscle deterioration during prolonged weightlessness. The machine was shipped to Ames Research Center (Moffett Field, CA) to support a muscle function study in which KSC participated and will arrive at the space center in September. [Boles. NASA/KSC RELEASE NO. 65-87, June 8, 1987.]

<> GENERAL DYNAMICS ANNOUNCEMENT

The announcement that General Dynamics would proceed with the construction of an additional 18 Atlas Centaur rockets was made today at the Paris Air Show. The rockets will be built in San Diego, CA, and launched from Cape Canaveral Air Force Station, FL. ["Atlas Rockets By Dynamics," THE NEW YORK TIMES, P.34, National Edition, June 16, 1987.]

<> KSC SPACE STATION OPERATIONS

NASA's space station operations task force has recommended to Administrator James Fletcher that operational control of the station be divided among four centers - Johnson, Marshall, Kennedy and Goddard.... Kennedy Space Center would take charge of logistics operations for the entire station.

A logistics operations center would be built at KSC, and the management of spares and supply requirements would be conducted from the center, rather than from various centers that have built the hardware. The task force also recommended that all sustaining engineering for the station be moved to Kennedy at some point in the 30-year life of the program, rather than having it distributed around the U.S. at the sponsoring NASA centers.

In a significant departure from shuttle operating methods, the task force proposed that experiment integration into station payload racks be performed at remote centers, instead of at the launch site at Kennedy Space Center. Users around the world would be allowed to integrate their payloads in their home laboratories, rather than spending

weeks or months at the launch site doing the work. The payload racks would undergo final checkout at KSC. [Foley. Aviation Week & Space Technology, p. 341-345, June 15, 1987.]

June 16: EG&G'S DUBAY TRADES JOBS

Jim Dubay, EG&G Florida's General Manager, will work with company security guards Debbie Rushing and Richard Bennett at Gate 2B on NASA Causeway. The three will be checking employee identification badges as they enter the space center and, later in the day, will gather in Dubay's executive office for a conference. EG&G spokeswoman Laurie Statmore said "Trading Places with Jim Dubay" will be a quarterly program in which the company's general manager will visit different departments in the company and perform hands-on work that employees perform daily.

"We established the program to recognize the vital role each member of the Base Operations team plays in the success of the KSC mission," Dubay said. "I want to gain a better appreciation for the challenges of each job and open the avenues for direct communications by our employees." [Mittman & Halvorson. FLORIDA TODAY, p. 2B, June 17, 1987.]

June 17: ATLAS-CENTAUR TEST COUNTDOWN

NASA and the General Dynamics Atlas-Centaur launch team at Cape Canaveral Air Force Station conducted a practice countdown today in preparation for a planned July 24 mission, officials said. The simulated countdown will include both mechanical and electrical tests on an Atlas

-Centaur rocket now being readied for launch on LC 36, said George Diller, NASA spokesman. [Halvorson. FLORIDA TODAY, p. 8A, June 17, 1987.]

<> ATLAS TESTS DELAY LAUNCH

The scheduled July 24 launch of an Atlas-Centaur rocket will probably be delayed so more tests of the rocket's nose cone can be done, NASA said. "There's nothing wrong with the nose fairing," said spokesman George Diller. "We want to do some further testing to provide added confidence that the fairing will work well when we fly." He said that the nose cone is a "beefed-up" version that has been used on the last eight Atlas flights. NASA nonetheless would like to "document our confidence in the fairing before we fly. We're reasonably confident we have a good fairing but we want to make sure. It's [NASA's] last Atlas-Centaur and

everyone wants it to go well. We certainly don't want to end the program on a sour note. Everybody thinks the tests are a good idea and that there's no reason not to do them," said Diller. NASA also announced it was halting a practice countdown for the launch because of a suspected oxygen leak in the \$78 million Atlas-Centaur rocket. [Halvorson. FLORIDA TODAY, p. 11A, June 18, 1987.]

June 19: BEGGS CASE DROPPED BY GOVERNMENT

Former NASA Administrator James Beggs declared himself vindicated when the Justice Department abandoned its fraud charges against him. The Justice Department cited insufficient evidence when it dropped charges against General Dynamics and four executives, including Beggs, who had worked for the company prior to joining NASA.

"I feel the four of us involved in this thing, and the company as well, have been vindicated," Beggs said. "We felt we had acted totally legally and ethically. I do feel some degree of bitterness to the individuals who should have reviewed this case.... Now that this ordeal is behind me, I'll try to speak out and help the agency and the program from my position as a private citizen." [Associated Press, "'Vindicated' Beggs Says He'll Speak Out on Space," FLORIDA TODAY, p. 1A, June 21, 1987.]

June 22: JUSTICE DEPT. ADMITS ERROR

The government, admitting that it did not know the nature of its contract for the defunct DIVAD gun system, said it erred in bringing a fraud indictment against General Dynamics Corp. and four of its former executives, including James Beggs, the former NASA Administrator. The Justice Department, in a statement on the dismissal of the indictment by a federal judge in Los Angeles, said it was sought by government prosecutors "because of the department's discovery of testimony and documents undermining the factual and legal theories on which the indictment was based." Beggs, speaking at the National Press Club, said, "As of today, we're all very pleased, and it seems a very great understatement to say that this nightmare is over." [UPI, "U. S. Admits Error in Indicting Beggs, Others," THE ORLANDO SENTINEL, p. A-13, June 23, 1987.]

June 23: SRB STACKING SHOULD IMPROVE

The National Research Council's fourth interim report to NASA Administrator Fletcher said that the agency should

"vigorously pursue" improvements in the way space shuttle solid rocket boosters are stacked for flight at Kennedy Space Center. The council, an operating arm of the National Academy of Sciences, is overseeing NASA's SRB redesign efforts.

The panel criticized the environment in which booster segments are stored and assembled at KSC and the way they are inspected prior to launch. During storage, booster segments endure varying temperatures and humidity changes and the bonds between segments are subjected to various stresses. "In ballistic missile programs," the panel noted, "similar circumstances have led to extensive programs to control environmental conditions under which (solid-fuel) motors are stored and to determine the response of the components to aging. We suggest that similar conditions apply in the case of the shuttle (boosters)."

The panel also recommended the "design and installation of an environmental control system suitable for protecting segments during assembly....Control of temperature, humidity and cleanliness are essential to achieving reliable bonds" between booster segments, the panel reported. In addition, the panel suggested that "segments be inspected again using more than a simple visual inspection when removed from long-term storage before assembly."

Hugh Harris, Kennedy Space Center spokesman, said NASA is currently studying a variety of ways to improve booster storage and assembly, including the possibility of installing a tent-like structure with a filtered air system to protect booster segments while they are being stacked. He also said that KSC and Marshall Space Flight Center are both studying the use of ultrasonic devices to detect flaws during future inspections. [Halvorson. FLORIDA TODAY, p. 12A, June 24, 1987.]

June 26: INDEFINITE ATLAS-CENTAUR LAUNCH DELAY

An indefinite launch delay is in store for NASA's last Atlas-Centaur launch, said Kennedy Space Center spokesman George Diller. More tests on the rocket's nose cone have been ordered to ensure that the cone works properly during the mission. No new launch date was set, but Diller said that a new date may be announced in mid-July. [Halvorson. FLORIDA TODAY, p. 6B, June 27, 1987.]

June 30: NEW ESCAPE HATCH

NASA decided to implement a plan providing for an escape hatch for Discovery when it launches in June 1988. No decision has yet been made on the rocket assist necessary to eject the crew safely in an emergency. The escape hatch is one of many changes made in the space transportation system. Twenty major changes have been made in the shuttles' main engines to increase their operating life, safety and reliability; external fuel tank lines will be strengthened and the solid fuel rocket boosters will be redesigned. [Associated Press, "Escape Hatch New for Shuttles in '88," FLORIDA TODAY, p. 1A, July 1, 1987.]

<>

JUNE SPACEPORT ATTENDANCE RECORD

A total of 248,938 visitors as compared to 221,321 in June 1986 toured Spaceport USA at Kennedy Space Center. Attendance for the first six months of 1987 was up 13.3 percent over 1986, said H. B. Chambers, general manager of Spaceport USA. ["Spaceport USA Eyes Another Record Year," FLORIDA TODAY, p. 16C, July 2, 1987.]

JULY

July 2: NASA FINDS ATLAS LEAK

NASA located the leak that ended a test countdown of the Atlas-Centaur rocket launch June 17. A tear in the device that guides the Centaur's engine was found during testing at LC 36 at Cape Canaveral Air Force Station. NASA spokesman George Diller said the tear allowed liquid oxygen to escape the engine area. Nevertheless, it was testing on the nose cone which delayed the launch, now scheduled for no earlier than July 24. Diller said the tear can be repaired in two weeks but starting the repair has not yet been scheduled. [Liden. FLORIDA TODAY, p. 8A, July 3, 1987.]

<> SRB FREED BY EXPLOSION

NASA crews used computers to trigger the detonation of two small explosives in order to destroy a bolt nut that had kept a shuttle's solid rocket booster stuck on a launch platform for two weeks. The detonation occurred at 4:48 a.m. and took place in an assembly building where the 27-foot rocket segment was mounted on a mobile launch platform. Lisa Malone, NASA spokeswoman, said the blast was the "same operation that they use during the liftoff," when the two explosives in the nut are triggered and the shuttle is released to fly. [White and FLORIDA TODAY Wires. FLORIDA TODAY, p. 8A, July 3.]

July 6: SPACE STATION COST

NASA's proposed space station will cost at least \$25 billion, perhaps more because of major unknowns, the National Research Council committee said. Headed by former NASA Deputy Administrator Robert Seamans, the council's report also said NASA must develop an emergency rescue vehicle that could be used as a lifeboat if astronauts have to abandon the space station for a return to Earth. Another cost complication involves trying to coordinate the work of NASA's four field centers, including Kennedy Space Center, each of which would be responsible for different sections of the station. [Glisch. THE ORLANDO SENTINEL, pp. A-1 & A-8, July 7, 1987.]

<> SOVIET LAUNCHES OFF-LIMITS TO U.S.

Use of the Soviets new commercial service to launch satellites or other payloads with U.S. technology into space is prohibited by American law, the State Department said

today. It added that Soviet officials have been "clearly informed of the longstanding prohibitions on the transfer of U.S. space technology to the Soviet Union" and "no change is contemplated." [AP. FLORIDA TODAY, p. 3A, July 7, 1987.]

July 8: ATLAS-CENTAUR DELAYED

A leak of liquid oxygen fuel in the upper stage of the Atlas-Centaur rocket scheduled for launch July 24 has forced NASA once again to postpone the liftoff till "late summer or early fall," according to agency spokesman George Diller. He said current plans call for engineers to begin removing the twin Centaur engines from the main body of the rocket in an effort to pinpoint the leak by checking seals, bolts, and welds. [Glisch. THE ORLANDO SENTINEL, p. A-4, July 9, 1987.]

July 10: TELSTAR'S 25TH ANNIVERSARY

Twenty-five years ago today (4:35 a.m.), a three-stage Thor-Delta rocket launched the 170-pound Telstar satellite, recalls the former director of unmanned launches, Robert Gray. "Telstar was the very first active communications satellite and I can remember just before launch, during the final minutes of countdown, wondering whether this thing would work or how well it would work. It was really a demonstration. It was primarily an experiment," Gray remembered. "We were pretty knowledgeable about the satellite and how it was supposed to work. We figured it would probably work all right, but we didn't know how well it would work, how much static there would be in the transmissions." [Halvorson. FLORIDA TODAY, pp. 1A-2A, July 10, 1987.]

July 13: ATLAS-CENTAUR DAMAGED

NASA's last Atlas-Centaur was extensively damaged today when workers accidentally ripped a hole in an empty liquid-hydrogen fuel tank housed inside the vehicle's upper stage. Officials did not know whether the damage could be repaired in order to launch the Pentagon's communications satellite which had already been delayed two months. Experts from NASA's Lewis Research Center and General Dynamics - maker of the Atlas Centaur for the past 25 years - will arrive at Kennedy Space Center July 14.

Four technicians suffered minor injuries in the late-morning accident which occurred at Launch Pad 36-B as they prepared to hoist the twin-engine Centaur stage from the main body of the rocket to search for a fuel leak. NASA spokesmen said a

service stand holding the technicians somehow hit the Centaur's thin metal skin while the stand was being pulled back, punching a hole in the liquid oxygen tank. Workers suffered cuts and scrapes as they retreated from escaping helium gas, said NASA spokesman Dick Young. The technicians were treated at KSC's health facility before returning to their jobs. [Glisch. THE ORLANDO SENTINEL, pp. A-1 & A-6, July 14, 1987.]

<>

DISCOVERY PROCESSING SCHEDULE

Kennedy Space Center Director Lt. Gen. Forrest McCartney, speaking at a National Space Club meeting in Tyson's Corner, Virginia, said processing for Discovery will begin in September and be completed in March 1988. Solid rocket booster hardware is expected to arrive in December and stacking will take place in January, followed by rollout to the pad in March. There will be a flight readiness firing in April or May in preparation for the expected June 1988 launch. The KSC director said that a shuttle fleet of three orbiters would allow for an annual launch rate of 10 or 11 missions, while a four-orbiter fleet would increase the launch rate to about 14 per year. McCartney also said that KSC launch facilities could accommodate the launch of shuttle-derived vehicles in addition to 14 manned shuttle missions if new processing facilities were built.

McCartney said that morale at Kennedy Space Center has improved but that the greatest improvement would occur when launches are resumed. He said that workers are extremely busy "with six-or seven-day, three-shift operating schedules," but added that managers were keeping close tabs on overtime so it did not become excessive, which was a pre-Challenger problem cited by the Rogers Commission. Shuttle technicians are being recertified under a new formal training program. "McCartney said each worker can be certified for a much smaller number of specialized tasks than was allowed prior to the accident to encourage the technicians to have a more highly focused expertise." ["NASA to Decide Between Two Options for 1989 New-Start Science Project," AVIATION WEEK & SPACE TECHNOLOGY, p. 138, July 13, 1987.]

July 14: ATLAS BOARD FORMED

NASA formed a special investigative board to probe the latest Atlas-Centaur launch pad setback. James Odom, director of science and engineering at Marshall Space Flight Center was expected to lead the inquiry into the July 13 accident which wrecked the upper stage. NASA spokesman

George Diller said the stage, which had been pressurized with helium, was "like a popped balloon." There are no spare fuel tanks or Centaur upper stages in NASA's inventory and it is not known how long it would take for General Dynamics to reopen its assembly line and manufacture another stage. "When we go, if we go, we don't have the foggiest," said Diller. "We're taking this day by day." He said technicians hoped to remove the Centaur from the main body of the rocket and return it to the General Dynamics plant in San Diego for extensive checkout. [Glisch. THE ORLANDO SENTINEL, p. A-3, July 15, 1987.]

July 15: MCDONNELL DOUGLAS CORP. SIGNS LAUNCH AGREEMENT

McDonnell Douglas Corp. announced that it had signed a \$100 million deal with Hughes Aircraft Co. to launch two commercial satellites from Cape Canaveral; the agreement makes it the first U.S. company to land a contract in the emerging commercial launch industry. The two Hughes-built satellites are for British Satellite Broadcasting Ltd., a London-based consortium, and will establish a satellite-to-home broadcast system in Europe. The first is to be launched in late 1989 and the second in the third quarter of 1990. [Hinman. THE ORLANDO SENTINEL, pp. C-1 & C-6, July 16, 1987.]

<> ACCIDENT PANEL NAMED

NASA named a five-member board to investigate the July 13 accident which damaged a hydrogen tank on an Atlas-Centaur rocket. James Odom, director of the science and engineering directorate at Marshall Space Flight Center was named to head the panel. Kennedy Space Center's director of space shuttle operations, Charles Gay, will serve as deputy director of the panel. The board is to report its findings by August 14 to Rear Adm. Richard Truly, NASA's Associate Administrator for space flight. ["Space Agency Names a Panel to Examine Rocket Accident," THE NEW YORK TIMES, (National Edition), p. 14, July 16, 1987.]

July 17: PRECISION MECHANICAL, INC. WINS CONTRACT

Kennedy Space Center awarded a \$173,900 contract to Precision Mechanical, Inc. (Cocoa, FL) to construct a 400-ton capacity cooling tower for use at the Vertical Processing Facility (VPF). The work to be performed by the contractor consists of constructing a new two-cell cooling tower with PVC fill, and removing a single-cell wooden

cooling tower, foundation and associated piping. [Boles. NASA/KSC NEWS RELEASE NO. 77-87, July 17, 1987.]

<> REYES AND LANG PROMOTED

Raul E. "Ernie" Reyes and John R. "Bob" Lang were promoted as co-directors in Kennedy Space Center's Safety Reliability and Quality Assurance Office which is headed by James A. "Gene" Thomas. Reyes was designated director for Quality Assurance and Lang was designated director for Safety and Reliability.

Reyes will oversee the Quality Engineering Office and three divisions: Shuttle Quality Assurance Division, Payload Quality Assurance Division, and Support Quality Assurance Division. He is responsible for the management and engineering of KSC's quality assurance program including quality engineering, inspection, technical guidance and direction to on-site KSC contractors, and off-site quality assurance support at vendor sources and development test facilities.

Lang is also responsible for three divisions: Safety Operations Division, Systems Performance and Trend Analysis Division, and Safety and Reliability Engineering Division. He is responsible for the management and direction of the safety and reliability programs at KSC including safety and reliability engineering, inspection, technical guidance and direction to on-site KSC contractors and evaluation of contractor performance. [Malone. NASA/KSC NEWS RELEASE NO. 69-87, July 17, 1987.]

July 18: ATLAS STAGE REMOVED

The upper stage of an Atlas Centaur rocket damaged last week was removed by workers at Cape Canaveral Air Force Station. NASA spokesman George Diller said workers spent the evening cutting away the damaged area of the hydrogen fuel tank which will be taken to a hangar at the air station where the accident investigation panel will examine it. The lower stage will also be removed and taken to the hangar early this week, Diller said. ["Damaged Atlas Stage Removed," FLORIDA TODAY, p. 1B, July 19, 1987.]

July 20: LAUNCH TEAM STRIKE

Rank-and-file members of General Dynamics Corp.'s Atlas-Centaur launch team went on strike today after a vote on July 18. Some 150 workers did not report to work and dozens picketed gates at Cape Canaveral Air Force Station and

Canaveral National Seashore. Local members of the International Association of Machinists and Aerospace Workers walked out despite voting against the strike 102 to 10.

Workers at Vandenberg Air Force Base in California voted against the strike 67 to 19, but company employees in San Diego approved the walkout 1,745 to 618. Bill Jones, picketing at Cape Canaveral Air Force Station, said, "Even though most of us here wanted to accept the contract, the majority of our members voted to strike, so that is what we are doing."

Space agency officials said the strike will not affect an investigation into the July 13 launch pad accident which damaged NASA's last Atlas-Centaur. [Halvorson and Brown. FLORIDA TODAY, p. 1A, July 21, 1987.]

<> REYES APPOINTED TO NATIONAL TASK FORCE

Raul E. "Ernie" Reyes, director of NASA Quality Assurance at KSC, has been appointed by Administrator Dr. James C. Fletcher to a select national-level Task Force on Women, Minorities, and the Handicapped in Science and Technology. Reyes, who joined NASA in 1962, had previously been active in equal opportunity efforts, serving as chairman of the KSC Equal Opportunity Action Committee from 1984 to 1986. [Phillips. NASA/KSC NEWS RELEASE NO. 78-87, July 20, 1987.]

July 23: QUALITY CONTROL WORKERS NEEDED

NASA's shuttle safety programs, according to a National Research Council report, remain hampered by a lack of quality-control workers, who are needed to perform new and more rigorous inspections. The NRC report also said officials at NASA must cooperate more or the overall safety network will suffer. The review panel found that most Criticality 1 items work was going well and was "very encouraged" by a battery of key tests and other studies on the three main shuttle engines.

"We think they're covering all the bases but we're also saying some fine-tuning can be done," said staff member David Johnson. The safety system was described as "headed in the right direction," but stretched too thin to meet a fast increasing workload. [Glisch. THE ORLANDO SENTINEL, p. A-8, July 24, 1987.]

July 25: NEW NASA BUDGET: NELSON

"When every other agency is getting cut - even defense-NASA is getting a 6 percent to 7 percent increase," Congressman Bill Nelson (D-Melb., FL) told a meeting of 20 top executives from NASA, Boeing Co., Lockheed Aircraft Corp., Pan American World Airways, Grumman Corp., Rockwell International, Rocketdyne and TGS at LaCita Country Club in Titusville. Nelson went on to say that Congressional confidence in the space program is not so easily translated. "The average Congressman," said Nelson, "can't believe some of the things that came out about Challenger. But the American people are still fascinated in space and they don't want less than an excellent space program."

The executives also discussed the impact of the new state sales tax on their contracts with the government. Companies are concerned the law may mean charging a 5 percent tax on subcontracted work, which would be passed on to government contracts. "If that occurs," said Nelson, "I think you've got a reasonable argument with the state government on why government services should be exempt." [Baker. FLORIDA TODAY, p. 1B, July 26, 1987.]

July 27: GENERAL DYNAMICS WORKERS RETURN

Most of General Dynamics Corp.'s workers returned to work at Cape Canaveral Air Force Station despite its union's rejection of a new contract proposal July 26. Company spokesman Jack Isabel said 112 people from the 150-member launch team were back to work. "It shows you that there's a lot of camaraderie among the people at the Cape," he said. NASA said the walkout had not affected an investigation into the July 13 launch pad accident that severely damaged NASA's last Atlas-Centaur. [Halvorson. FLORIDA TODAY, p. 1A, July 28, 1987.]

July 28: VIC LANE CONSTRUCTION CONTRACT

Kennedy Space Center awarded a \$342,345 contract to Vic Lane Construction, Inc. (Merritt Island, FL), to provide four 350-horsepower air compressors for use at the Complex 39 Utility Annex. The two existing compressors will be disassembled and replaced with four smaller units of equal capacity, allowing more latitude for interchange during maintenance. [Boles. NASA/KSC NEWS RELEASE (unnumbered), July 28, 1987.]

July 30: EBON RESEARCH SYSTEMS CONTRACT

Kennedy Space Center awarded EBON Research Systems (Altamonte Springs, FL) a \$199,977 contract to generate a database and drawing digitization system. The new system will replace engineering drawings that contain specifications required for buying various components used on shuttle ground support equipment. [Boles. NASA/KSC NEWS RELEASE NO. 83-87, July 30, 1987.]

<> BIONETICS CONTRACT EXTENDED

Lockheed Space Operations Co. has extended the Bionetics Corp.'s subcontract for Shuttle Calibration Laboratory Support Services at Kennedy Space Center; the extension is valued at more than \$7 million. Bionetics will continue to calibrate, repair and certify test measurement and diagnostic equipment in support of manned space flights. The company was a prime contractor at KSC from 1976 till 1983, when it became a subcontractor to LSOC. "Shuttle Contract Extended," FLORIDA TODAY, p. 18C, July 31, 1987.]

July 31: SPACEPORT USA ATTENDANCE

Spaceport USA has just completed its tenth straight record-breaking attendance. This month 301,173 persons - compared to 279,538 in 1986 - toured the Kennedy Space Center attraction. Yearly attendance is running 11.9 percent above the 1986 level, according to Spaceport officials. ["Spaceport USA Sets Another Record," FLORIDA TODAY, p. 16C, Aug. 4, 1987.]

AUGUST

August 2: SPACEPORT ART GALLERY OPENS

The Spaceport USA Art Gallery opened today, providing a permanent home for the bulk of the NASA art collection, including a 70-piece exhibit, "The Artist and the Space Shuttle." The exhibit had previously hung in the Smithsonian Institution in Washington, D.C., and had toured the world. The opening is part of Spaceport USA's twentieth birthday. Arnold Richman, chief of visitors services for NASA and instrumental in creating the gallery, said, "This is a logical place to house the collection. We are the largest NASA visitors center in the country. We dedicated 6,000 square feet of exhibit space to the gallery because we felt it was that important. It really tells the human story of the space program." [Bergman-Angstadt. FLORIDA TODAY, pp. 9-10F, Aug. 2, 1987.]

August 3: DISCOVERY "POWERED-UP"

Discovery was "powered-up" with electricity for a detailed checkout of its electrical system, including the modifications on that system since the Challenger accident. Electricity was first pumped into Discovery around noon, permitting engineers to begin a five-week test of changes made on the shuttle since January of 1986. Particular attention will be paid to the avionics system which serves as the "brain" of the orbiter by monitoring and controlling thousands of functions from liftoff to landing. Shuttle launch director Bob Sieck said of the powering-up, "It indicates the capability of the program to meet milestones that have been set. Everybody worked toward it, and here we are."

As the electricity flowed into the shuttle, a sign flashed "Vehicle Powered," and engineers and technicians working with the orbiter in a hangar clapped and cheered. Then technicians turned on cooling systems and began a systematic check of the shuttle's instruments, communications, radar, and other systems.

Modifications have been made to improve the orbiter's structural, communications and instrumentation systems, fuel valves, landing gear door and thermal protection system. Among changes not finished concern the main engines and brakes and installation of a blowout cabin hatch which would enable the crew to bail out during certain emergencies,

though not one like the explosion that destroyed Challenger. [Glisch. THE ORLANDO SENTINEL, p. A-1, Aug. 4, 1987, and "Shuttle Discovery in First Readiness Test," THE NEW YORK TIMES (National Edition), p. 19, Aug. 4, 1987.]

<> TPS SYSTEM REDESIGN

Detailed redesign is underway of the thermal protection system used in the wing/elevon cove area of the orbiter to provide increased thermal protection in this area where extensive re-entry damage had been experienced. A new carbon-carbon panel is also being developed to replace thermal tiles on the forward end of the orbiter between the nose cap and the nose wheel door. Damage in this area has affected vehicle turnaround at Kennedy Space Center. ["Industry Observer," AVIATION WEEK & SPACE TECHNOLOGY, p. 17, Aug. 3, 1987.]

August 4: ATLAS ACCIDENT PANEL

James Odom, head of the NASA panel investigating the July 13 Atlas accident told a House space subcommittee that two "countdown demonstration tests" showed there was a leak from the hydrogen tank in the Centaur upper stage making removal of the stage necessary. But first, workers had to swing away a work platform, one of several that girdle the rocket on the pad. "In removing the platform," Odom said, "a light cable that went from a fixed light on the tower over to the receptacle was inadvertently left connected. This light cord then came against a movable work stand that, in the process of retracting the platform, rolled this work stand off. It went down, hit the next platform below and ricocheted into the Centaur face, one of the legs rupturing the skin of the Centaur."

Adm. Richard Truly, head of space flight for NASA, said, "This tank cannot be repaired. It was essentially destroyed." Truly and Odom gave the subcommittee and interim report on the July 13 incident and responded as well to questions concerning the destruction by lightning March 26 of another Atlas Centaur shortly after launch. ["Forgotten Power Line Doomed Rocket Tank," THE ORLANDO SENTINEL, p. A-3, Aug. 5, 1987.]

August 10: INTELSAT SIGNS MARTIN CONTRACT

The two largest commercial communications satellites ever put into orbit would be launched as the result of a contract

signed today between International Telecommunications Satellite Organization and Martin Marietta. The launches should occur in 1989 and 1990 from Cape Canaveral Air Force Station aboard unmanned Titan rockets built by Martin Marietta, said Tony Trujillo, a spokesman for Intelsat. Just a week ago, Martin Marietta signed an agreement with the Air Force to use government launch facilities at Cape Canaveral. [Halvorson. FLORIDA TODAY, p. 3B, Aug. 11, 1987.]

<> HAUCK PRAISES KSC WORKERS FOR 'POWER-UP'

'Powering-Up' Discovery on schedule last week brought praise for Kennedy Space Center workers from astronaut Frederick "Rick" Hauck in a private ceremony at the Orbiter Processing Facility. Also present were astronaut Richard Covey and mission specialists John Lounge and David Hilmer. "People making dreams reality is what it's all about," NASA spokesman Hugh Harris quoted Hauck as telling the workers. "We appreciate the great work you have done to bring us to this day."

Harris said KSC Director Forrest McCartney also praised workers for meeting the Aug. 3 milestone date. "People said you couldn't make it, but knowing you, I never had any doubt," McCartney told the KSC shuttle workers. "I knew you'd do it and do it right."

Discovery's schedule of events for the next ten months includes the following:

- *Sept. 8: "Mission specific" flight preparations begin.
- *Mar. 12: Discovery is rolled out to Launch Complex 39B.
- *April 8: Discovery's main engines are tested during a 20-second flight readiness firing at the pad.
- *May 3: NASA conducts a practice countdown at the pad.

The targeted June 2 launch is to be followed by a June 6 landing at Edwards Air Force Base [CA] and Discovery returns to KSC by June 11. [Halvorson. FLORIDA TODAY, p. 3B, Aug. 10, 1987.]

August 11: MCDONNELL DOUGLAS SATELLITE LAUNCH CONTRACT

McDonnell Douglas signed a \$50 million contract with the International Maritime Satellite Organization to launch an Immarsat communications satellite from Cape Canaveral Air Force Station in late 1989. McDonnell Douglas has

commitments for three other commercial launches for its Delta, besides the latest with the London-based maritime consortium. [Hinman. THE ORLANDO SENTINEL, p. 1C, Aug. 12, 1987.]

August 12: GOOCH NEW ESMC COMMANDER

Air Force Col. Lawrence Gooch assumed command of the Eastern Space and Missile Center at Patrick Air Force Base; he replaced Air Force Col. John Mansur, who retired after 24 years of active duty. Mansur had served as ESMC head for the past 14 months. [Glisch. THE ORLANDO SENTINEL, p.D-1, Aug. 13, 1987.]

August 20: WIND DAMAGES CENTER BUILDINGS

High winds and a possible tornado caused minor damage at the space center this afternoon during thunderstorms in north Brevard County. NASA officials received a report of a funnel cloud touching down at 3:48 p.m. in a wooded area near a shuttle viewing stand on West Schwartz Road between the Vehicle Assembly Building and the Headquarters Building. KSC security reported downed trees but no blocked roads. There was also minor damage to the United Technologies USBI booster production company, located on the center. A small section of aluminum roof was torn from the shuttle booster assembly and refurbishing building, an air conditioning fan cover came off and a large pine tree fell near a parking lot said company spokeswoman Andrea Shea-King. She said damage was minor and that there were no injuries. [Bumpus-Hooper. THE ORLANDO SENTINEL, p. B-1, Aug. 21, 1987.]

August 21: FUMES OVERCOME WORKER

A construction worker at Kennedy Space Center was overcome by fumes as he was applying rubber sealant to part of a building being erected to house space shuttles, NASA spokesman Pat Phillips said. The worker, a pipe fitter employed by Specialty Maintenance and Construction Inc. (Lakeland, FL), was sickened by the fumes about 12:15 p.m. and was taken to KSC's health facility where he received treatment; he was given the remainder of the day off from work. ["Pipe Fitter Becomes Ill From Fumes," THE ORLANDO SENTINEL, p. D-2, Aug. 22, 1987.]

August 26: ATLAS-CENTAUR MOVED TO STORAGE

The first stage of NASA's last Atlas-Centaur rocket was removed from its launch pad and placed in storage in a hanger at Cape Canaveral Air Force Station, officials said. The upper stage had been damaged in a pad accident July 13. Officials from both NASA and the Dept. of Defense still must determine how to launch the military communications satellite which was to have been launched aboard the Atlas-Centaur. ["NASA to Move Rocket to Storage," FLORIDA TODAY, p. 4A, Aug. 26, 1987 and "First Stage of Atlas Rests in Storage," FLORIDA TODAY, p. 1B, Aug. 27, 1987.]

August 27: BOOSTER FIRING DELAYED

The first full-scale firing of Morton Thiokol's redesigned shuttle booster was delayed till Aug. 29 due to technical problems which halted two attempts to fire the rocket today. The first attempt to come at 3 p.m. EDT and was stopped 10 seconds short of firing. The second attempt was halted 12 seconds before an attempt at 7 p.m. EDT. None of the problems were associated with the motor itself. Speaking for his company, Ed Garrison, president of Morton Thiokol Aerospace Group, said, "Sorry, we tried hard. We'll get it off." [Fisher. THE ORLANDO SENTINEL, pp. A-1 & A-10, Aug. 28, 1987.]

<> ALL WORLD TRAVEL CONTRACT

All World Travel Agency (Cocoa Beach, FL) was awarded a \$2 million contract by Kennedy Space Center to coordinate all official and leisure travel arrangements for the space center's 2,000 NASA employees. The award marks the first time a local travel agency has been used by NASA and is a departure from the traditional use of the government-operated Scheduled Airlines Ticket Office. Travel With Class, a Melbourne branch of All World Travel owned and operated by Howard and Nancy McCabe, will serve as a backup to the Cocoa Beach office for the contract. ["All World Wins NASA Contract," FLORIDA TODAY, p. 16C, Aug. 28, 1987.]

August 28: BOOSTER FIRING ON HOLD

A critical test-firing of Morton Thiokol's redesign solid rocket booster was postponed till Aug. 30 at the earliest. Engineers will conduct several countdown dry runs to test systems that malfunctioned Aug. 27. A joint statement of

Thiokol and NASA said the work proceeded at "a measured pace" and that they would not "reschedule the test until they are satisfied that all problems...are fully understood and have been resolved." ["Booster Firing on Hold," THE ORLANDO SENTINEL, p. A-3, Aug. 29, 1987.]

August 29: BOOSTER FIRING RESCHEDULED

NASA spokesman Dominick Amatore said the firing of the 126-foot-long rocket had been rescheduled for 3 p.m. EDT Aug. 30 at the Morton Thiokol Inc. plant in the northern Utah desert. Engineers from Morton Thiokol and NASA spent most of today checking and repairing test equipment that malfunctioned three times on the 28th. A broken water main halted the first countdown 10 seconds before ignition and computer problems halted two other test-firing countdowns. ["NASA Aims for Booster Firing Today," THE ORLANDO SENTINEL, p. A-3, Aug. 30, 1987.]

August 30: SRB PASSES FIRING TEST

A major NASA hurdle was passed today when its redesigned solid rocket booster was successfully test-fired. Officials from both NASA and SRB manufacturer Morton Thiokol Inc. both claimed the test was a tremendous success. "I can assure you this is a major step on the way to returning the shuttle to flight," said Rear Admiral Richard Truly, who heads the agency's Office of Space Flight. "We've worked for a long time to get a design. But proof in the pudding always comes not on the drawing board but when you test the motor," he said. The test cost approximately \$15 million. [Halvorson. FLORIDA TODAY, p. 1A, Aug. 31, 1987.]

<> MCCARTNEY RECOMPETES FOR CENTER DIRECTORSHIP

Lt. General Forrest McCartney retires from the Air Force this week and must then re compete for his present job as Director of Kennedy Space Center. NASA spokesman Dick Young said that "No change in directorship is expected." Under civil service regulations, McCartney's retirement from the Air Force after 34 years, effective Sept. 1, forces him to compete for his current post as director of KSC, Young said. [Harris. FLORIDA TODAY, p. 1A, Aug. 31, 1987.]

August 31: McCARTNEY NAMED KSC HEAD

Hours after retiring from the Air Force, Lt. Gen. Forrest S. McCartney was named director of Kennedy Space Center by NASA Administrator James Fletcher. [See story above.] NASA spokesman Dick Young said two others, whose names were not disclosed, applied for the directorship. McCartney was rated "highly qualified" and was chosen, Young said. [Halvorson. FLORIDA TODAY, 1A, Sept. 1, 1987.]

<>

IVEY'S STEEL CONTRACT

Kennedy Space Center awarded Ivey's Steel Erectors (Merritt Island, FL) a \$597,197 contract to upgrade the heating, ventilating and air-conditioning system at hangar AE, a NASA facility at the Cape Canaveral Air Force Station used for processing shuttle payloads. Ivey's will install 360-ton chillers and a cooling tower and pump, in addition to replacing the chilled water distribution system. ["Ivey's Steel Wins Contract," FLORIDA TODAY, p. 16C, Sept. 1, 1987.]

<>

SPACEPORT ATTENDANCE

August attendance at Spaceport USA was the highest for that month since 1966, the year the attraction opened. August was also the 11th straight month of record-breaking attendance; 270,814 persons visited Spaceport compared to 232,510 for August 1986. Summer attendance is 820,925, topping the previous record of 724,766 in 1986. ["Spaceport Reports Record Attendance," FLORIDA TODAY, p. 16C, Sept. 2, 1987.]

September

September 4: AIR FORCE TO CUT SHUTTLE USAGE

The Department of Defense plans to double its fleet of unmanned Titan 4 rockets to reduce reliance on the space shuttle Pentagon spokesman Capt. Marty Hauser said today. An Air Force proposal to buy 27 more Titan 4's will shortly be presented to Congress, said Hauser. "The whole thing is predicated on the fact that the shuttle will have a reduced performance capability and a reduced launch rate (when flights resume in mid-1988)," he said. [Halvorson. FLORIDA TODAY, p. 1A, Sept. 5, 1987.]

September 5: NEUHARTH'S ENDS BUS TOUR AT SPACEPORT

Kennedy Space Center and a tour around it was the last leg Gannett Chairman Allen H. Neuharth's 50-state tour of the United States over the past six months. The Neuharth tour group and a crew from People magazine toured KSC along with Hugh Harris, deputy director of public affairs, and George Meguiar, Spaceport's manager of marketing. Harris narrated the tour, which went past the Vehicle Assembly Building and the LCC to a launch viewing site. [Glissmann. FLORIDA TODAY, p. 1D, Sept. 6, 1987.]

September 7: KSC SAFETY MANAGEMENT PHILOSOPHY

NASA's new Space Flight Safety Panel found that Kennedy Space Center's safety management philosophy for launch site operations had been too narrow in scope. It found that Kennedy safety personnel had been assessing primarily ground processing hazards of certain procedures, not the broader implications of actions that could be critical to vehicle performance or survival of the crew, according to astronaut Marine Col. Bryan D. O'Connor, who heads the panel. These problems are now being pursued aggressively by Kennedy managers, said O'Connor. ["NASA Panel Would Withhold Accident Witness Accounts," AVIATION WEEK & SPACE TECHNOLOGY, Sept. 7, 1987.]

September 9: COLUMBIA MOVED TO OMRF

Columbia was towed to the new Orbiter Maintenance and Refurbishment Facility at Kennedy Space Center to undergo extensive modification. The new OMRF is expected to ease

processing procedures when shuttle flights resume in the summer of 1988. NASA spokeswoman Pat Phillips said the OMRF is designed to serve as a third bay for shuttles so inspections can be made without interrupting the normal processing flow at the space center's other two Orbiter Processing Facilities. The new building - which is 197 feet long, 150 feet wide and 95 feet tall - will also be used to store other shuttles when they aren't being processed for flight, said Phillips. Columbia is expected to stay in the OMRF till Discovery is moved from an OPF to the Vehicle Assembly Building in March, 1988. ["New Repair Shop Opens for Space Shuttles," cutline, THE NEW YORK TIMES (National Edition), p. 13, Sept. 10, 1987, and Halvorson. FLORIDA TODAY, p. 2A, Sept. 10, 1987.]

September 11: KSC EMPLOYMENT RETURNING TO PRE-CHALLENGER LEVELS

Kennedy Space Center director Forrest McCartney said the center's work force should be back to pre-Challenger levels before the year ends. Nearly 1,500 persons have been hired since January and another 150 should be added by the close of 1987. The director said the rehiring and the increased pace of preparations for the June 1988 launch have contributed to a rise in center morale. "I'm not trying to say morale can't get any better; what I'm saying is that it is improving," said McCartney at his regularly scheduled press meeting. He also said that unspecified disciplinary action had been taken as a result of the July 13 accident which damaged NASA's last Atlas-Centaur rocket. He did not elaborate. [Lafferty. THE ORLANDO SENTINEL, p. A-10, Sept. 12, 1987.]

September 18: BOOSTER PASSES FIRST TEST

NASA has declared last month's test firing of the shuttle's redesigned booster a complete success; the June 1988 launch date remains on track, according to John Thomas, head of the booster redesign project at Marshall Space Flight Center. NASA plans other critical tests on the booster for November, February and March. Thomas said, "If the other tests look good, we could drop one or two but it's still a schedule and we plan to keep them." [Glisch. THE ORLANDO SENTINEL, p. A-8, Sept. 19, 1987.]

September 20: ASTRONAUT MEMORIAL CONTEST

A nationwide architectural competition for the design of the planned astronauts memorial at Kennedy Space Center was announced today. Alan Helman, chairman of the foundation's

board said, "The opening of a national competition is a major step on the road to reaching a primary goal for the Astronauts Memorial Foundation. The competition will help achieve excellence in the planning, design and construction of the astronauts memorial." [Jean. THE ORLANDO SENTINEL, p. B-1, Sept. 21, 1987.]

September 21: MAJOR CORPORATION OF YEAR-EG&G FLORIDA

EG&G Florida has been named "1987 Major Corporation of the Year" by the Greater Florida Minority Development Council for its assistance to small minority firms. The "McNair Award" was presented to Shirley Wildermuth, EG&G's small business administrator, for her contribution to minority business development. The award, established in honor of Ronald McNair of the STS 51L crew, is presented annually by GFMDC to an individual who makes significant contributions to the minority business community. ["EG&G Recognized For Minority Aid," FLORIDA TODAY, p. 16C, Sept. 22, 1987.]

September 22: LACK OF FUNDS HAMPERS SECURITY/KSC

Kennedy Space Center cannot be enclosed with a sophisticated anti-terrorist fence before Discovery's June 1988 flight because NASA lacks the money, according to the space agency's security officials. The original plan called for \$25 million to be expended for underground sensors and microwave detectors. In its place, KSC is installing a \$200,000 sensor-studded "test bed" to determine how well the system works, said space center security chief Gary Wistrand. Security problems were highlighted last January when 50 nuclear protesters infiltrated parts of the space center and nearby Cape Canaveral Air Force Station. [Glisch. THE ORLANDO SENTINEL, p. A-5, Sept. 23, 1987.]

September 29: HOLLOWAY CORPORATION CONTRACT

Kennedy Space Center awarded Holloway Corporation (Titusville, FL) a \$192,888 contract for construction of a protective enclosure for an electrical switching station located at Launch Pad A, Complex 39. [Boles. NASA/KSC NEWS RELEASE NO. 104-87, Sept. 29, 1987.]

September 30: SPACEPORT ATTENDANCE RECORD

September was the 12th consecutive month of record-breaking attendance at Spaceport USA and was the highest for the month since the tourist center opened in 1966. A total of 127,388 persons visited Spaceport, surpassing 1981's previous record, said TW Vice President H. B. Chambers. He said attendance is averaging 13.5 percent more than the record year of 1986. ["Spaceport Reports Record Attendance," FLORIDA TODAY, p. 16C, Oct. 2, 1987.]

October

October 2: THAI OFFICIALS TOUR KSC

A delegation from Thailand toured Kennedy Space Center today viewing the space shuttle Columbia, the pad from which Discovery will be launched in June 1988 and the launch control center. Thailand's Prime Minister Preem Tinsulanonda headed a group of 35 persons who toured the center before heading to New York.

The tour began with a welcome by center director Gen. Forrest McCartney and a slide presentation. The director presented the prime minister with a gold etching of the space center, including a shuttle silhouette, encased in glass. The etching had flown aboard Columbia in January 1986. [Kayne. FLORIDA TODAY, p. 1B, Oct. 3, 1987.]

October 5: AIR PRODUCTS & CHEMICALS CONTRACT

Kennedy Space Center awarded a contract extension valued at \$61,083,300 to Air Products and Chemicals, Inc. (Allentown, PA) to continue providing liquid hydrogen for the space shuttle. [Boles. NASA/KSC NEWS RELEASE NO. 107-87, Oct. 5, 1987.]

October 7: INTERNATIONAL STEEL INDUSTRIES CONTRACT

Kennedy Space Center awarded International Steel Industries Inc. (Orlando, FL) a \$423,300 contract to perform modifications on the Launch Equipment Shop at Complex 39. [Boles. NASA/KSC NEWS RELEASE NO. 108-87, Oct. 7, 1987.]

October 8: NOZZLE TEST: THIRD SUCCESS

Officials of Morton Thiokol Inc. hailed the third in a series of tests of the redesigned solid rocket booster nozzle as a complete success. NASA spokesman Bruce Buckingham said the test-firing in Brigham City, Utah, "was deemed successful." The test was designed to determine whether a deliberate flaw in the joint that connects the rocket's nozzle to its body would allow hot gases to escape the booster. The redesigned nozzle joint included 100 additional bolts, adhesively bonded insulation and a third O-ring, designed to supplement the primary and secondary rings and to keep adhesive from seeping past the insulation. [Halvorson. FLORIDA TODAY, p. 9A, Oct. 9, 1987.]

<>

BOOSTER DELIVERY PROBLEMS

NASA said that manufacturing problems will delay delivery of new rocket boosters to Kennedy Space Center, but should not affect the planned June 1988 launch of Discovery. The delay, according to agency spokeswoman Sarah Keegan, is expected to be two weeks; the boosters should arrive at KSC by late December. [Fisher. THE ORLANDO SENTINEL, p. A-15, Oct. 9, 1987.]

October 14: DENG PUFANG TOURS KSC

Deng Pufang, director of the China Fund for the Handicapped, toured Kennedy Space Center today with other countrymen from the People's Republic of China. The son of PRC leader Deng Xiaoping, Deng Pufang is touring the United States to see first-hand how this country deals with the social, medical, economic and educational needs of the disabled. Deng himself is paralyzed from the waist down since he was injured by Red Guards during China's Cultural Revolution. [Harrison. THE ORLANDO SENTINEL, pp. D-1 & D-4, Oct. 15, 1987.]

<>

ENGINES MAY DELAY LAUNCH

An apparent leak in a critical main engine system may endanger the planned June 1988 launch of Discovery. The leak is suspected in the "heat exchanger," which converts liquid oxygen fuel into gaseous oxygen, according to NASA spokesman Jerry Berg. Four engines are currently undergoing tests at the National Space Laboratory at Bay St. Louis, MS. The first shuttle main engine was to have been delivered to Kennedy Space Center in mid-November, the second Dec. 6, and the third Jan. 6.

Richard Volz, a member of the Aerospace Safety Advisory Panel, said today that pressure on workers preparing the shuttle for launch will not override safety concerns in getting the system going again. "Everybody who I have come in contact with is extremely concerned and taking extreme care to try to make sure that everything goes right. I'm very convinced that they will not launch Discovery before absolutely everything is checked out to the best of everyone's ability, even if that causes the launch timetable to slip somewhat."

Volz said he does not feel the problems with the engines will force dangerous shortcuts. "I think the biggest

problem we have is not one of attitude in trying to make it right or anything like that. It's just the immensity of the job. We've got to make sure everything is done right and checked out," he said. [Halvorson. FLORIDA TODAY, pp. 1A-2A, Oct. 15, 1987, and White. FLORIDA TODAY, p. 2A, Oct. 15, 1987.]

<>

LAUNCH PAD EMERGENCY PRACTICE

Officials from Kennedy Space Center and four area hospitals joined to practice procedures for use during launch pad emergencies. During the mock emergency drill, nine KSC workers feigned injuries at LC 39, according to KSC spokeswoman Lisa Malone. Center biomedical experts assessed the simulated injuries and then rushed all nine to emergency vehicles stationed near the pad. Three helicopters flew the "injured" to Shands Hospital in Gainesville, Orlando Regional Medical Center and Florida Hospital in Orlando. A KSC ambulance also transported one worker to Jess Parrish Memorial Hospital in Titusville. Malone said the drill was one in a series of simulations being conducted to improve emergency rescue procedures at KSC. ["KSC, Hospitals Practice Launch Pad Emergency Plan," FLORIDA TODAY, p. 2A, Oct. 15, 1987.]

October 20: ENGINE LEAK MAY CAUSE DELAY

NASA Administrator James Fletcher discussed the agency's rigid pre-launch timetable with officials at Kennedy Space Center today. "We have an internal schedule to launch Discovery on June," he said. "We are still on the June 2 track, although there's not much slack left. If we have more major things go wrong we might not make the June date." [Glisch. THE ORLANDO SENTINEL, p. A-3, Oct. 21, 1987.]

October 21: W & J CONSTRUCTION CORP. CONTRACT

W & J Construction Corp. (Cocoa, FL) was picked to negotiate a \$13.2 million contract to build and activate a Launch Complex 39 Operations and Support Facility to house 1500 engineers and support personnel at Kennedy Space Center's LC 39. The building will be constructed in 17 months and contain office space, conference rooms and support areas for shuttle operations, officials said. [Halvorson. FLORIDA TODAY, p. 1A, Oct. 22, 1987.]

October 22: SHUTTLE FLIGHT PLAN REVEALED

NASA announced plans today to launch 19 shuttles over the next three years and 49 unmanned rockets between 1988 and 1995. The new schedule reveals a number of secret military cargoes and an increasing emphasis on space science missions. The \$1 billion Hubble Space Telescope, for instance, is slated for a June 1989 launch. [Halvorson. FLORIDA TODAY, p. 1A, Oct. 23, 1987.]

October 23: CHALLENGER PLATES NET \$3.2 MILLION

Challenger license plate sales have earned \$3.2 million for the Astronauts Memorial Foundation since they went on sale Jan. 2. Fifteen dollars of from the sale of each plate is given to the memorial foundation to cover the \$4 million cost of designing, constructing and maintaining an astronauts' memorial at Kennedy Space Center and for developing a space exploration educational program. ["Challenger Plates Raise \$3.2 Million for Memorial," THE ORLANDO SENTINEL, p. D-8, Oct. 24, 1987.]

October 24: CAPE CANAVERAL PROTESTS

A six-hour rally and protest against Trident 2 missile testing at Cape Canaveral Air Force Station resulted in the arrest of seven Floridians; in January, following a similar protest, 186 persons were arrested. [Cohen. FLORIDA TODAY, p. 1A, Oct. 25, 1987.]

October 26: AIR FORCE LAUNCHES TITAN 34D

An unmanned Titan 34D lifted off at 4:32 p.m. from Vandenberg Air Force Base in California. The military declined to identify the mission's payload. Air Force Secretary Edward "Pete" Aldridge said, "This launch has tremendous significance for the nation's space program. This Titan 34D success allows us to resume the launching of critical national security payloads on a regular basis." [Halvorson. FLORIDA TODAY, pp. 1A-2A, Oct. 27, 1987.]

October 31: SPACEPORT ATTENDANCE RECORD

Spaceport USA has set a new attendance record for the 13th consecutive month and has passed 1986's record attendance with two months remaining in the year. A total of 158,381

persons toured the attraction compared to 127,833 last October. H. B. Chambers, vice president and general manager of TW Recreational Services which operates the visitors center, said, "So far, the record-breaking year of 1987 is ahead of 1986 by 14.2 percent." ["Spaceport USA Sets Attendance Records," FLORIDA TODAY, p. 16C, Nov. 3, 1987.]

November

November 3: PROJECT DAEDALUS FLIER VISITS KSC

Glenn Tremml, one of two fliers who hope to pedal a superlight aircraft 73 miles over the Aegean Sea, visited Kennedy Space Center today. The three-year Project Daedalus, run by Massachusetts Institute of Technology, is named after the Greek inventor Daedalus, who according to legend, escaped from the island of Crete 3,500 years ago by building wings of feathers and wax and flying away under his own power. In March Tremml hopes to recreate the flight in his 70-pound aircraft named Daedalus. [Glisch. THE ORLANDO SENTINEL, pp. B-1 & B-4, Nov. 4, 1987.]

November 4: EG&G WINS COMMERCE AWARD

The U. S. Department of Commerce named EG&G Florida the Corporation of the Year as part of Minority Enterprise Development Week. The company was one of 10 in the United States chosen for the award, presented in Washington, D.C., at the White House. The award recognized companies that demonstrate strong support of and commitment to the development of minority businesses. The criteria to earn the award include the corporation's formal policy toward minority development, its goals and outreach efforts. ["EG&G Awarded Top Honors," FLORIDA TODAY, p. 18C, Nov. 5, 1987.]

<>

JUNE LAUNCH MAY FACE DELAY

Discovery's June 2 launch date may slip because of problems unless Kennedy Space Center workers are able to work extra weekends, said Richard Truly, NASA Associate Administrator for Space Flight. He said that sections of Discovery's boosters will arrive at KSC in mid-January, a full month later than originally scheduled.

"I believe that we can make it. If we continue to see problems, we may have a slip in the schedule," Truly said before the American Astronautical Society's annual meeting. "I can assure you that if it takes until the third of June or the fourth, or even until July, we will fly when we're ready," he said. Officials at KSC said that workers are already working weekends. ["Official: Shuttle May Be Delayed," FLORIDA TODAY, p. 2A, Nov. 5, 1987.]

<>

LAIID-OFF WORKERS

Most companies are poorly prepared to deal with large-scale layoffs of their employees, according to a University of Florida researcher who studied layoffs in Pittsburgh and in Brevard County. Lockheed Space Operations Co. spokesman Stuart Shadbolt disputed researcher Daniel Feldman's claim concerning layoffs and said aerospace corporations in Brevard County went out of their way to help workers laid off after the Challenger disaster. [Halvorson. FLORIDA TODAY, p. 8A, Nov. 5, 1987.]

<>

ATLAS-CENTAUR NASA REPORT

A NASA report on the Atlas-Centaur accident of July 13 cited slipshod procedures and inadequate attention to safety among ten "contributing causes". The report said that "the primary cause of the mishap was the dislodging of a work stand by a power cord from an overhead light." Other contributing causes were: requirements for tying off loose objects were inadequate and/or ignored; launch pad procedures allowing a power cord to be left connected to a movable work platform were extremely poor; equipment was installed on the launch pad without proper review or authorization; no observer was present to monitor the area where the work platform was located. [Halvorson. FLORIDA TODAY, p. 8A, Nov. 5, 1987.]

November 6: BOEING CHOSEN FOR CONTRACT NEGOTIATIONS

Kennedy Space Center chose Boeing Aerospace Operations (Cocoa Beach, FL) to negotiate leading to an estimated \$26 million contract for engineering services. "We're really excited about it," said John Eckle, Boeing general manager. "It was a very tough competition. There were 13 companies in the running."

The contract will consolidate work now performed by Planning Research Corp. and Specialty Maintenance and Construction Inc., such as engineering and management for high technology and research projects at KSC as well as routine technician and documentation support to the KSC Directorate of Engineering Development. ["Boeing Wins \$26 Million Contract for KSC Services," FLORIDA TODAY, p. 12C, Nov. 7, 1987.]

November 7: FLORIDA CHALLENGER 7K RUN

More than 400 persons took part in the second annual Florida Challenger 7K Run/Walk-A-Thon and numerous others purchased Challenger license plates. Proceeds from both went to the Astronauts Memorial Foundation. The parents of Challenger crew member Gregory Jarvis - Bruce and Ellen Jarvis of Orlando - took part in the event. "We will never, ever, in our lifetime, get over our special loss. We have to make their sacrifice worth it," said Mrs. Jarvis. [White. FLORIDA TODAY, p. 1A, Nov. 8, 1987.]

November 9: DISCOVERY LAUNCH ON SCHEDULE

Kennedy Space Center's Operations Director - John Conway - told a Brevard County League of Cities meeting in Titusville that the June 2 launch of Discovery seems more and more certain. "We're going to take our time and do it right. We've got to make absolutely sure the (shuttle) is safe," Conway said. "We're starting to work our schedules around problems rather than analyzing what we're doing wrong."

"I can't pretend," he said. "We've got a long way to go to come back and restore our credibility. All schedules are beginning to come together. A main fuel valve is expected to arrive at KSC this week; three flight engines should arrive Jan. 4; a crew hatch completed by Jan. 14 and solid rocket motors arrive Jan. 16." [Kayne. FLORIDA TODAY, p. 2B, Nov. 10, 1987.]

November 10: DAVIS CONSTRUCTION CONTRACT FOR HMF

Kennedy Space Center awarded H. W. Davis Construction Inc. (Orlando, FL) a \$214,990 contract to construct a storage building for housing ground support equipment used in hypergolic operations. The building will be erected at the Hypergolic Maintenance Facility (HMF), eight miles southeast of the Vehicle Assembly Building. The new, one-story pre-engineered building is needed, according to KSC officials, to store the ground support equipment together in a single facility near the Hypergolic Maintenance Facility. [Boles. NASA/KSC NEWS RELEASE NO. 116-87, Nov. 10, 1987.]

November 14: NEW BOOSTER SEGMENTS AT KSC

A month-long test of two new solid rocket booster segments begins today when workers check new tools and work

procedures, according to KSC officials. The new segments arrived by rail this week from Morton Thiokol in Utah. Test Director Charles Stevenson said the work will serve as a dress rehearsal for assembling actual boosters used to launch Discovery next June. "This will be the first test using the new flight hardware with flight technicians," he said. "Based on what we've seen I don't think we'll have any problems with it." [Glisch. THE ORLANDO SENTINEL, p. A-17, Nov. 15, 1987.]

<>

MCCARTNEY SPEAKS AT NMA

Kennedy Space Center Director Forrest S. McCartney gave the opening address at a seminar sponsored by the 2,300-member Florida Space Coast Council of the National Management Association. McCartney's speech - entitled "Management in the 1990s: Changes in the Work Environment" - dealt at length with the difficulties of management in the post-Challenger era at the space center.

"The bottom line," McCartney said, "is that we are being asked to do a whole lot more with less, and the key to doing that is going to be management. If at any time I feel that we don't have the resources to do it safely, they're going to have to find another center director. I'm not going to be part of a losing team." [White. FLORIDA TODAY, p. 2A, Nov. 15, 1987.]

November 17: BOOSTER ASSEMBLY EXERCISE

KSC workers started assembling shuttle booster segments for the first time since the Challenger disaster, NASA officials said. The current effort will focus on assembling the "aft" segments, those which failed and caused the Challenger explosion. John Thomas, manager of the redesign project, said problems with fabricating Discovery's left booster nozzle have delayed its delivery till January. KSC Launch Director Robert Sieck said processing schedules still indicate that Discovery should make its June 2 launch date.

"What we've done to accommodate that," said Sieck, "is to set up our work force so that we can process our solid rocket booster activity around the clock, seven days a week." [Halvorson. FLORIDA TODAY, p. 9A, Nov. 18, 1987.]

November 18: KSC EDUCATION PLAN

Apollo 11 astronaut Neil Armstrong and Astronauts Memorial Foundation director Edward Moran met with 21 other persons in Orlando to plan an educational program the foundation hopes to establish at Kennedy Space Center's Spaceport USA. "We have committed ourselves," Moran said, "to announce the focus of the educational program of the foundation on Jan. 27," the 21st anniversary of the Apollo 1 fire in 1967 and the eve of the second anniversary of the S1-L accident.

"We have to define what the focus of the foundation's educational program will be and what the delivery system would be," Moran said. "Whatever it is we do, we want [it] to be a quality job. The word came through loud and clear: Better you should do one thing and do it extremely well than try to be all things to all people and not do anything well." [Halvorson. FLORIDA TODAY, p. 7A, Nov. 19, 1987.]

<>

BUTLER CONSTRUCTION CONTRACT

Kennedy Space Center awarded an \$82,700 contract to Butler Construction Company (Rockledge, FL) for modifications to an area of the Operations and Checkout (O & C) Building. The changes to an existing room will provide approximately 580 square feet for payload checkout equipment and will include the installation of raised floor panels, an 8-ton air-conditioning unit, a fire protection halon system, electrical panel and fluorescent lights. The contract also calls for painting and repairs. [Boles. NASA/KSC NEWS RELEASE NO. 117-87, Nov. 18, 1987.]

November 20: PIONEER SYSTEMS INC. CONTRACT

Pioneer Systems Inc. (West Melbourne, FL) won a \$3 million NASA contract to test a system that would enable NASA to recover the main engines and avionics packages on unmanned shuttle flights. Pioneer Systems will test a module it designed for the land-based recovery of unmanned shuttle systems. "Recovery systems are our life's blood," said Bill Wailes, vice president of the company that designed and developed the recovery system for reusable shuttle SRB's. "We have a strong track record in space vehicle recovery. In fact," Wailes said, "we have the track record in large space vehicle component recovery." [Halvorson. FLORIDA TODAY, p. 1B, Nov. 21, 1987.]

November 23: NASA SENDS CONTRACTOR EMPLOYEES TO MSFC

NASA recently rewarded contractor employees at KSC for jobs well done by flying them up to Huntsville, Alabama, for a VIP tour of the Marshall Space Flight Center. In addition to USBI employees, Tracey Higginbotham, Tashunda, Mary Lou Wade and Paula Rutledge, five other companies and the Civil Service Employees of Kennedy Space Center sent workers. The other contractors were Grumman Technical Services, Inc.; McDonnell Douglas Astronautics Co.; EG&G Florida, Inc.; Lockheed Space Operations Co.; and Rockwell International. ["Jobs Done Well Earn KSC Employees Trip," FLORIDA TODAY, p. 2D, Nov. 23, 1987.]

<>

TESTS MAY DELAY DISCOVERY LAUNCH

A National Research Council panel monitoring the SRB redesign efforts has said more tests are needed before the Discovery is launched, despite the already tight schedule. Panel chief Guyford Stever noted booster test program successes, but said several "significant" new tests were needed to make sure all components of the redesigned rocket are safe. [Fisher. THE ORLANDO SENTINEL, p. A-5, Nov. 24, 1987.]

November 25: NASA HIRING FREEZE

NASA Administrator James Fletcher ordered a hiring freeze after Congress and President Reagan enacted a plan to reduce the national deficit by \$30 billion in 1988. Tom Utsman, KSC deputy director, said the freeze would not affect the launch of Discovery, but could hamper "parallel work" to prepare Atlantis and Columbia for flights set for September and December of 1988. He also said the freeze "definitely will be hurting" efforts to bolster the ranks of civil-service safety and quality-control engineers. KSC spokesman Dick Young said the space center couldn't yet provide a "firm number" of civil-service jobs that it cannot now fill.

Utsman also noted that NASA contractors may also have to freeze their hiring. "We're waiting for the other shoe to drop," Utsman said. John Williams, Lockheed Space Operations Co. spokesman, said the shuttle processing contractor has already slowed its hiring because of the uncertainty. McDonnell Douglas Aerospace spokesperson Pat Oliver said, "We expect to start hiring heavily at the first of the year." [Glisch and Fisher. THE ORLANDO SENTINEL, p. A-3, Nov. 26, 1987.]

<>

THIOKOL RETURNS CHALLENGER MOTOR

Dave Ewing, Morton Thiokol Inc. vice president of space operations, said the company had conducted metallurgical tests for the past six months at its Utah plant on a Challenger motor. The tests were to make sure that an insulation bond hadn't contributed to the explosions. The debris was returned to Kennedy Space Center for storage in a Minuteman missile silo. ["Thiokol Returns Shuttle Motor," FLORIDA TODAY, p. 1B, Nov. 26, 1987.]

November 29: TITAN 34D LAUNCHED

A classified Pentagon payload was launched today aboard a Titan 34D. Liftoff came at 10:27 p.m. from Cape Canaveral Air Force Station. Commander of the Eastern Test Range at Patrick Air Force Base Col. Lawrence Gooch said, "We are really back in the space business now. We're going to be very busy around here from now on." Gooch said the missile center's contractor work force will jump from 5,000 to 10,000 by 1990 to accommodate the rapidly accelerating launch rate. ["Secret Titan Launch Propels Program To A 'New Heyday'," THE ORLANDO SENTINEL, B-2, Nov. 30, 1987.]

November 30: PAYLOAD WEIGHT INCREASES

NASA has increased the allowable landing weight for shuttles from 211,000 pounds to 230,000 for flights beginning in the summer of 1989. Richard Truly, associate administrator for space flight, said the increase resulted from a review of the forces the shuttle encounters during maneuvers just prior to landing. Truly also said the agency would eventually allow shuttles to carry an additional 100,000 pounds of weight. [Hinman. Central Florida Business in THE ORLANDO SENTINEL, p. 30, Nov. 30-Dec. 6, 1987.]

<>

PARK FEES

NASA spokesman Hugh Harris said agency officials have concluded they have no legal authority to oppose proposed admission fees in a section of the Merritt Island National Wildlife Refuge. Harris also said that NASA will offer an opinion on the plan to the Department of Interior later this week, but declined to say whether Kennedy Space Center favors the plan. [Brown. FLORIDA TODAY, p. 1B, Nov. 30, 1987.]

December

December 1: SPACE STATION CONTRACTS AWARDED

The National Aeronautics and Space Administration awarded contracts today to four companies to begin building the nation's first permanent outpost in space. The program would cost a minimum of \$14 billion and be the last manned space program of the 20th century for the United States. The winning companies are aerospace divisions of the Boeing Company, the McDonnell Douglas Corporation, the General Electric Company and the Rockwell International Corporation. [Stevenson. THE NEW YORK TIMES, (National Edition), pp. 1 & 35, Dec. 2, 1987.]

<>

NASA TO OPPOSE REFUGE FEE

NASA will object to entrance fees at Merritt Island National Wildlife Refuge, which unexpectedly began charging park visitors on orders from the U. S. Fish and Wildlife Service. "The word we got," said Dorn Whitmore, refuge spokesman, "was we were going to implement by Dec. 1. As soon as we got word we started installing facilities." NASA spokesman Hugh Harris said the space agency will oppose the fees but would not reveal the reasons because a letter to refuge officials had not yet been mailed. [Lafferty. THE ORLANDO SENTINEL, p. D-4, Dec. 2, 1987.]

<>

ASTRONAUT EISELE DIES

Former Apollo astronaut Donn Eisele, who flew aboard the first manned Apollo mission in 1968, died of a heart attack in Tokyo. Eisele was in Japan with former astronaut Alan Shepard to announce the establishment of a space camp to help children learn about spaceflight. [Jean. THE ORLANDO SENTINEL, pp. A-1 & A-18, Dec. 3, 1987.]

December 2: KSC SPACE STATION JOBS

Twelve new jobs will open immediately at Kennedy Space Center as a result of the space station contract awarded by NASA to McDonnell Douglas Corp.'s aerospace division, said company spokeswoman Pat Oliver. She said the majority of those first jobs will come from the local labor pool and from the division's Huntington Beach, CA, headquarters. The first KSC jobs will be in readying the station for loading onto whichever shuttle will carry it into space. [Liden. FLORIDA TODAY, p. 4A, Dec. 3, 1987.]

December 3: ENGINE TESTS SUCCESSFUL

NASA announced that two of the three engines to be used on Discovery's upcoming mission have been successfully test-fired. "This is a major milestone and keeps us on course to deliver three engines within Kennedy Space Center's requirement for a June Shuttle flight," said Jerry Smelser, deputy engine project manager at Marshall Space Flight Center. The tests were conducted Nov. 21 and Nov. 28 at the National Space Technology Laboratory at Bay St. Louis, Mississippi. The tests were followed by complete engine examinations which showed that the engines performed within established standards, said Jerry Berg, NASA spokesman.

"We're going to send (Kennedy Space Center) some Christmas presents and New Year's presents," said Boyce Mix, Marshall Space Flight Center resident manager in Bay St. Louis. The engines should be shipped from Mississippi on Dec. 17, Dec. 24 and about Jan. 1, Mix said.

Kennedy Space Center spokesman George Diller also seemed relieved. "Apparently they've been making up the time pretty well. The engines are not behind in their testing at this point. It looks like we're going to have all three of them here by early January," Diller said. After engine installation, Discovery will be moved to the launch pad March 12. A 20-second test-firing of the main engines is scheduled for April 8 and a practice countdown is set for May 3. [White. FLORIDA TODAY, pp. 1A-2A, Dec. 4, 1987.]

December 4: CHALLENGER PIECE RETURNED TO NASA

Don and Norma Lowe (Florence, NC) have reluctantly returned a piece of the shuttle Challenger they found in June of this year in return for a guest spot at the next shuttle launch. The piece was from the covering for the in-flight maneuvering engines. The Lowes had reported their find to NASA in August. Mrs. Lowe said, "They have promised us a picture of Challenger, and because of our willingness to give up the piece, they invited us to be NASA's guest at the next space shuttle launching. For that we are very grateful, and we will be there to enjoy it. Our two grandchildren will love it." ["Finders Return Piece of Challenger Shuttle to NASA," THE ORLANDO SENTINEL, p. A-15, Dec. 5, 1987.]

<> REFUGE FEES DROPPED

The U. S. Department of Interior eliminated the charging of entrance fees at the Merritt Island National Wildlife Refuge

which surrounds Kennedy Space Center. Refuge Director Steven Vehrs said, "We'll probably make more in donations." He noted that only \$74 was collected the four days the fee was in effect. NASA and U. S. Rep. Bill Nelson (D-Melbourne, FL) had opposed the fees. [Bryant. FLORIDA TODAY, p. 1A, Dec. 5, 1987.]

December 8: NASA GIVES CONTRACTORS AWARDS

McDonnell Douglas Astronautics, payload processing contractor at Kennedy Space Center, was selected by NASA as the center's top large business contractor for fiscal 1987 for its efforts to procure more goods and services from small businesses, according to Norm Perry, NASA industry assistance officer. Brown and Associates Management Services Inc. - also known as BAMSI, was named minority-owned small business of the year; BAMSI had previously won the award for fiscal 1982 and 1983.

Citrech Inc. was chosen small business of the year for completing on schedule a crucial contract to repair a cooling tower at a building which houses expensive flight hardware, said Perry. VA Paving Inc., which made modifications to a parking lot near the launch complex for the space shuttle, was named woman-owned small business of the year.

New World Services Inc., which handles library and information services under a subcontract with EG&G Florida Inc., was chosen subcontractor of the year. Like McDonnell Douglas and BAMSI, New World Services has been honored previously by Kennedy Space Center in fiscal 1982. [Carey. THE ORLANDO SENTINEL, pp. B-1 & B-6, Dec. 9, 1987.]

<> GUARDS UNION ACCEPTS CONTRACT

Security workers at Kennedy Space Center voted 69-61 to accept a three-year contract that increases the average salary from \$10.71 to \$11.08 an hour, officials said. The United Plant Guard Workers of America, the union for EG&G Florida Inc., base operations contractor at KSC, has been in negotiations since Sept. 25 and voted Nov. 19 to strike, according to Laurie Statmore, public relations manager for EG&G. ["KSC Workers Accept Contract," FLORIDA TODAY, p. 1B, Dec. 9, 1987.]

December 9: TRASH FOUND IN FUEL TANK

Sandpaper and other small pieces of junk were found inside an external fuel tank planned for use with Columbia in a

flight scheduled for late 1988. Engineers found the materials which included wire and scraps of foam and aluminum last week at Kennedy Space Center. Lisa Malone, space center spokesperson, said that if the trash had not been found it would have been caught by filters in the shuttle's fuel lines and not caused a problem during flight. However, she said that "any debris in flight hardware is cause for concern" and that the matter is under investigation. [Glisch. THE ORLANDO SENTINEL, p. A-8, Dec. 10, 1987.]

<>

ATLANTIS POWERED UP

Kennedy Space Center workers powered up the shuttle Atlantis today and began preparing for a visit next week by the orbiter's crew for its September 1988 launch. Atlantis's electrical systems were switched on at 11:57 a.m. and extensive tests were begun to check hundreds of modifications made to the shuttle since the Challenger explosion, said NASA spokesperson Lisa Malone. She said testing of Atlantis's systems will continue till February, when more detailed, "mission specific" flight preparations begin. Rollout to LC 39B is set for the summer of 1988. [Halvorson. FLORIDA TODAY, p. 1A, Dec. 10, 1987.]

December 17: JUNE LAUNCH MAY SLIP

Kennedy Space Center Director Forrest S. McCartney said in a year-end press conference that the June 2 launch date for Discovery may slip a few weeks while workers play catch-up in a number of areas such as tile installation. He also said a hiring freeze may cause the postponement of the 1988 flights of Atlantis and Columbia. "We do not have enough workers to process all three orbiters at the same time," McCartney said. "Without the resources, we cannot maintain the flight rate we've been asked to. Quality and safety are number one. If anything needs to be adjusted, the schedule will be adjusted. We will not adjust the way we do business." [Glisch. THE ORLANDO SENTINEL, pp. A-1 & A-10, Dec. 18, 1987.]

<>

ATLANTIS CREW AT KSC

Members of Atlantis's crew for the STS 27 flight visited with workers today at Kennedy Space Center. Present were Air Force Lt. Col. Jerry Ross, Navy Cmdr. William Shepherd, Air Force Col. Richard Mullane and Navy Cmdr. Robert "Hoot" Gibson. ["KSC Visit," (photo cutline), FLORIDA TODAY, p. 2A, Dec. 18, 1987.]

December 18: DEBUS'S SECRETARY KILLED IN PLANE CRASH

Shirley Fergerson Farino, who served as executive secretary to the late Dr. Kurt H. Debus, was killed in an airplane crash while on safari in Africa with her family. She and her husband and daughter were among 12 Americans killed in the crash. Shirley Fergerson worked for Kennedy Space Center's first director from the late 1950s to the early 1970s. On August 27, 1974, shortly before Dr. Debus retired, she left NASA and married Ernest Farino. The couple moved to Texas where they worked at the Amarillo Veterans Administration Medical Center. ["In Memory: Shirley Fergerson Farino," SPACEPORT NEWS, p. 7, Dec. 18, 1987.]

December 19: BOOSTER TEST DELAYED

A delay in Morton Thiokol's testing of a redesigned solid rocket booster occurred when a full-scale test firing aborted one second from ignition. KSC Public Affairs spokesman Dick Young said, "I'm not aware that the schedule is so tight that it could not handle a slight delay." A previous full-scale test firing took place August 30 and was declared a complete success. The second full-scale test of the shuttle's redesigned solid rocket booster was rescheduled for Dec. 23. Four such tests are required by NASA before shuttle flights resume. [White. FLORIDA TODAY, p. 1A, Dec. 20, 1987 and "Booster Gets Second Shot Wednesday," FLORIDA TODAY, p. 1A, Dec. 22, 1987.]

December 23: SRB TESTED IN UTAH

NASA's redesigned solid rocket booster underwent its second test-firing in 25-degree weather with a wind chill factor of 20 degrees below zero. Heaters kept the booster joints and their O-ring seals as warm as 90 degrees for more than 14 hours before the test. "Yes, Virginia, there is a Santa Claus," said J. R. Thompson, director of the Marshall Space Flight Center in Huntsville, Ala. "It makes us a very happy Christmas."

The test was delayed 90 minutes because of the weather and had been postponed from Saturday (Dec. 19) when the firing was aborted one second before ignition. [Fisher. THE ORLANDO SENTINEL, pp. A-1 & A-4, Dec. 24, 1987.]

December 29: BOOSTER NOZZLE FAILS

NASA officials said a failure experienced during the Dec. 23 test of the redesigned solid rocket booster will delay the resumption of manned space flights scheduled for June 2.

"The failure will delay the next shuttle flight. The extent of the delay will not be known for several days," said David Garrett, chief NASA spokesman in Washington, D. C. Rocky Raab, spokesman for Morton Thiokol which manufactured the booster, said, "We haven't seen the NASA statement and until we do we cannot comment."

The rocket motor nozzle damage that led NASA to announce a delay in the next shuttle flight could present major engineering problems, experts said. Myron Uman, director of a National Research Council panel that has overseen NASA's redesign program, said, "It's serious. The flight nozzles were already built with this lay-up. Dec. 30 was the day they had scheduled to send the first flight nozzles to the Cape. They may have to scrap it, start all over again or use the old design. It's [the nozzle] a big thing, with lots of parts to it, and it has to be very carefully processed. It's not easy to do."

Morton Thiokol engineer Roger Boisjoly said that nozzle problems are critical because of the nozzle's physical location in the array of orbiter components assembled at KSC before each flight. "The big thing about the nozzle," Boisjoly said, "is that it's attached to the aft segment," referring to the bottom most part of the four rocket segments that are stacked, then attached to the side of the shuttle by space center workers. [Halvorson. FLORIDA TODAY, pp. 1A-2A and Lunner, FLORIDA TODAY, p. 2A, Dec. 30, 1988.]

December 30: "EXTREME TESTING" & SRB NOZZLE FAILURE

NASA engineers said today that "extreme testing" may be the cause of the test failure on Dec. 23. The nozzles on the SRB's are designed to turn 4.7 degrees. But, for the test, the nozzle's rings were deliberately moved seven degrees. "That extreme testing may or may not have something to do with breaking that piece," said NASA propulsion director Russ Bardos. NASA booster engineer Royce Mitchell said, "Nothing adverse happened to any vital part of the motor." NASA Administrator James Fletcher said, "This is what tests are for - to discover problems." [Kelley. USA TODAY, p. 3A, Dec. 31, 1988.]

<>

TEST FAILURE NOT "A MAJOR SETBACK"

Launch Director Robert Sieck said that the Dec. 23 SRB test failure was not a "major setback" in NASA's plans to launch Discovery in June. Sieck said KSC's workers will be ready to launch the shuttle about five months after two of the segmented boosters are delivered to the space center. Referring to the test failure, Sieck said, "It's a disappointment because it adds to the uncertainty of what the launch target will be. We were looking at receiving the first booster segments...during the first of January. That delivery now has been delayed and the duration of that delay has not been determined. There's a lot of work to be done here and the work force here is motivated by that work." [Halvorson. FLORIDA TODAY, p. 1A, Dec. 31, 1987.]

<>

KSC MORALE HIGH

"I am very pleased in looking at the progress we made this year," said KSC Director Forrest McCartney in a FLORIDA TODAY article. "We had a very good year. We achieved a lot of goals we made for ourselves and I think morale is very high right now. We've certainly come a long way this year, but I'd also tell you that we have a long way to go." [Halvorson. FLORIDA TODAY, p. 4A, Dec. 31, 1987.]

December 31: SPACEPORT USA RECORD YEAR

Spaceport USA attracted a record 2.48 million visitors in 1987, according to Spaceport's marketing manager George Meguiar. The expected June launch of Discovery was also expected to boost attendance in 1988. Attendance was up 16.4 percent in 1987 over 1986 when 2.13 visitors toured the attraction. Spaceport USA also set its 15th consecutive monthly record with 167,399 visitors in December and established a one-day record with 23,374 on Dec. 29, said Meguiar. [Carey. THE ORLANDO SENTINEL, p. C-1, Jan. 5, 1988.]

INDEX

Accident Panel Named/Odom and Gay.	59
Air Force to Cut Shuttle Usage	
Plans to Purchase 27 Titan 4's.	71
Air Products & Chemicals	
Contract Extension for Provision of Liquid Hydrogen.	75
Aldrich, Arnold	
Director, Space Transportation Program Office.	41
Launch Delay.	40
Aldridge, Edward "Pete"/Secretary, USAF.	78
All World Travel Contract/KSC and CCAFS.	68
American Astronautical Society	
Classified Military Space Symposium (May 27, 1987).	44
Ames Research Center/Muscle Function Testing.	51
Annual Launch Rate.	58
Anti-Terror.	73
Apollo 1 Fire/January 27, 1967.	7
Apt, Jan (Astronaut)/Emergency Landing Exercise.	32
Armstrong, Neil (Apollo Astronaut)	
Astronauts Memorial Foundation Education Plans.	84
Astronauts Memorial Foundation.	72, 84
Astrotech Space Operations	
Titusville Satellite Processing Plant.	35
Astronauts Test Pad Escape/Two Day-Night Drills	48
Atlantis.	85
Launch Postponement Discussed.	90
Power Up (December 9, 1987).	90
Processing/Move to OPF.	22
STS 27 Crew Visits KSC (December 27, 1987).	90
Atlas Accident Panel	
Odom, James (Head, NASA Investigative Panel).	59, 65
First Meeting at KSC.	29, 30
Atlas Centaur	
Anniversary (May 8, 1962)	50
Damage	57
Delay/Mid-July Announcement.	54
Atlas Centaur Accident.	58
Flight Computer Found	35
FLTSATCOM Payload.	24
Investigation.	59
Liquid Oxygen Leak.	52, 57
Mission Failure (March 26, 1987)	26, 30, 33, 42
NASA Report on July 13, 1987, Accident.	81
Postponing of June 11, 1987, Mission.	32
Atlas Centaur Damaged/Service Stand.	57
Fuel Leak.	6
Launch Delays.	57
Launch Scheduled for July 24, 1987.	52

Launch Team/Strike.	60
Move to Storage/Pad Accident (July 13, 1987).	68
New Rockets.	50
Rockets.	52
Test Countdown/LC 36, July 24 Launch.	52
Atlas Stage Removed/CCAFS Hangar.	60
Automobile Accident (February 7, 1986).	23
Baker, Robert (Park Service Regional Director).	5
Ball, Jim/Transfer to NASA Headquarters.	49
Bardos, Russ (NASA Propulsion Director)	
Extreme Testing.	92
Beck, Don (Brevard Chairman, AMF).	2
Bennett, Richard/Trading With Dubay (EG&G Florida Inc.).	52
Bent, Rodney/Expert in Atmospheric Electricity.	25
Bergman, Jules (ABC News)/Obituary.	15
Biomedical Operations and Research Office	
Muscle Function Testing.	51
Bionetics Contract Extended	
Shuttle Calibration Laboratory Contract for LSOC.	63
Boeing Aerospace Operations (Cocoa Beach, FL)	
Rehiring Plans.	8
Engineering Services Contract Negotiations.	81, 87
Layoffs.	4
Boisjoly, Roger (Morton Thiokol Inc. Engineer)	
December 23 Test Failure.	92
Booster Delivery Problems.	76
Booster Firing Delayed	
Morton Thiokol Aerospace Group.	68
Booster Passes First Test/August 1987	72
Brevard Booth at Spaceport USA.	14
Brevard County	
League of Cities/Conway Speech.	82
Brevard Woman Chosen to be Astronaut	
Dozier, Jan (Aerospace Engineer at MSFC).	49
Brigham City, Utah/Morton Thiokol Inc.	75
British Satellite Broadcasting Ltd.	
McDonnell Douglas Corp. Commercial Launch Customer.	59
Britt's Air Conditioning, Inc./Contract.	19
Brown and Associates Management Services Inc. [BAMSI]	
Minority Owned Small Business of Year.	89
Budget, FY 1988.	1
Bush, Jeb (Florida Commerce Dept., Sec.)/Space Commission.	46
Busse, Jon (Head, Atlas Accident Panel).	25, 27, 30, 39, 41, 42
Butler Construction Company (Rockledge, FL)	
Modifications to O & C Building.	84
Canaveral National Seashore Fees.	5
Cape Canaveral Air Force Station [CCAFS].	10, 19, 33, 52, 73
Atlas Centaur Move to Hangar.	68
General Dynamics Launch Team.	50
General Dynamics Strike.	60

Glenn Orbital Flight.	16
Missile Protests	78
Carpenter, Scott (Mercury Seven).	10
Caserta, Richard/Lockheed Employee Injured.	22
Catrambone, Joe (Ex. VP, Titusville Chamber of Commerce).	14
Challenger.	50, 90
Commemoration.	9
Debris Burial.	2, 16
License Plates.	78
Tribute.	7
Chambers, H. B. (VP, TW Recreational Services).	11, 26, 74, 79
Chattecx Corporation Contract Award	
Muscle Function Testing Machine.	51
Citrech Inc./Small Business of the Year.	89
Columbia.	85
Launch Postponement Discussed.	90
Move to OMRF/Modifications for 1988 Flight.	71
Trash Found in External Tank (December 9, 1988).	89
Commercial Launch Down Payments/Martin Marietta.	36
Construction Projects.	1
Contract ELVs.	43
Contractor Employees at KSC Sent to MSFC by NASA	
NASA Reward for Job Performances.	85
Conway, John (Dir. Payload Mgmt. & Operations)	
Discovery Launch Date.	82
Cooper, Gordon (Mercury Seven).	10
Corporation of Year, EG&G Florida/1987 Winner.	73
Costello Construction Co. Contract	
LCC Window Gaskets.	46
Covey, Richard (Astronaut)	
Discovery Power-Up Ceremony at OPF.	18, 66
Crippen, Robert (Capt., USN)	
Deputy Director of Shuttle Operations, NASA.	27
Launch Processes Review Panel	41
Space Congress Speaker.	37
Criticality 1 Items/National Research Council Report.	61
Culbertson, Frank (Commander, USN, Astronaut)	
Emergency Landing Exercise.	32
Pad Escape Crew.	48
Davidson, Louis & Paulette Davidson.	23
Davis, H. W., Construction Inc./Storage Building for GSE.	82
Debris/Atlas Centaur.	27
Debus, Kurt H. (Late KSC Director).	91
Delta Rocket.	10, 31
Deng Pufang Tours KSC.	76
Deng Xiaoping.	76
Department of Interior	
Admission Fees to Merritt Island Wildlife Refuge.	86
Oil Leasing Off Brevard County Coast.	45

Dickensen, Dave (Lockheed Space Operations Co.)	
Retirement.	31
Dickerson, David (Spokesman for Rep. Bill Nelson (D-Melb.))	
Beach Access.	23, 49
Diemoz, Dennis/Lockheed Contract Administrator.	20
Discovery.	8, 85
Crew at Kennedy Space Center.	18
Crew Cabin Hatch.	31, 55
First Post-Challenger Launch.	76
Flight Readiness Firing.	58
June 1, 1988, Launch Date.	48
Launch Date Slip.	90
Launch Delay.	34, 35
Orbiter Modifications.	41
Power-Up.	64
Processing.	58
Security for 1988 Flight.	73
Test-Firing Recommendation.	32
Truly, Richard (Assoc. Administrator, Space Flight).	80
Wrench.	45
Doyan, Dennis/Nuclear Missiles Protest Spokesman.	5
Drug Tests, Thiokol Employees.	43
Dubay, Jim (EG&G Florida General Manager).	52
East Central Florida Space Business Roundtable	
Martinez Speech (Florida Governor).	46
Eastern Space and Missile Center/Oil Leases.	49
Ebon Research Systems Contract	
Database and Drawing Digitization System.	63
Eckle, John (Boeing General Manager)	
Engineering Services.	81
Edwards Air Force Base, California	
Discovery Landing Site (June 6, 1988).	66
EG&G Florida Inc./Base Operations Contract.	23, 89
Commerce Dept. Minority Enterprise Development Award.	80
Contract Signed With Security Union.	89
Employees Sent to MSFC by NASA.	85
Rehiring Plans.	8
SBA "Excellent" Rating.	13
Eisele, Donn (Apollo Astronaut) Obituary.	87
Elam, Willa/Arrested Nuclear Missile Protestor.	5
Emergency Landing Procedures.	31
Emergency Rescue Vehicle/National Research Council Report.	56
Ewing, Dave (Morton Thiokol Inc. Vice President)	
Challenger Motor Tests.	86
Extreme Testing/December 23, 1987, Test Failure.	92
Farino, Shirley Ferguson	
Debus's Secretary.	91
Feldman, Daniel (University of Florida Researcher on Layoffs).	81
Feynman, Richard/Challenger Commission Member.	26
First Post-Challenger Flight Projected for June 1988.	44

Flag Ceremonies	
Challenger Memorials in Brevard County Schools. . . . .	.7
Fletcher, James (NASA Administrator).	14, 33, 43
December 23, 1987, Test Failure. . . . .	.92
McCartney Named Kennedy Space Center Director. . . . .	.70
Orders Hiring Freeze.	85
Shuttle Payload Contract Comments	20
Visit to Kennedy Space Center.	54, 77
Flight Readiness Firing 1/Discovery in April-May, 1988.	58
Florida Challenger 7K Run/Walk-a-Thon	
Fund Raising for Astronauts Memorial Foundation. . . . .	.82
Florida Hospital (Orlando, Florida)/Pad Emergency Practice. . . . .	.77
FLTSATCOM Satellite/Launch Delay.	6
Freedom, Liberty and Independence Recovery Ships. . . . .	.27
Friendship 7/25th Anniversary.	16
Fumes Overcome Worker	
Specialty Maintenance & Construction Inc.	67
Garrison, Ed (Pres., Morton Thiokol Aerospace Group)	
Booster Firing Delays	68
Gay, Charles (Dir. Space Shuttle Operations)	
Deputy Accident Panel Head. . . . .	.59
Launch Processes Review Panel. . . . .	.41
General Dynamics	
Atlas Centaur Accident.	57
Atlas Centaur Manufacturer.	59
Atlas Stage.	6
Commercial Satellite Launches. . . . .	.34
Fraud Case Dropped.	53
Atlas Centaur Launch Team/LC 36. . . . .	.52
Workers Return/Air Force Station Strike. . . . .	.62
General Electric Company. . . . .	.87
Gibb, John (Atlas Centaur Project Director)	
Rocket Failure.	24
Gibson, Robert "Hoot" (Cmdr., USN)/STS 27 Crew Member.	90
Glen, John (Mercury Seven). . . . .	.10
Homecoming Celebrations. . . . .	.19
Goddard S-Band Tracking Data Network Station. . . . .	.45
GOES-H Launch (LC 17, CCAFS)	
GOES.	10
GOES-H.	17
Gooch, Lawrence (Col., USAF)/New ESMC Commander	
Replaces Col. John Mansur, USAF. . . . .	.67
Titan 34D Launch.	86
Gray, Robert (formerly NASA Dir. of Unmanned Launches). . . . .	.57
Greater Florida Minority Development Council	
McNair Award for Minority Business Development.	73
Greene, Jay/Launch Processes Review Panel.	41
Grissom, Betty	
Grissom, Gus (Mercury Seven/Apollo 204 Fire).	10

Grumman Technical Services, Inc.	
Employees Sent to Marshall Space Flight Center by NASA.	85
Hanchey, George T. (EG&G Employee).	23
Harris, Hugh (Deputy Director, Public Affairs, KSC)	
(Text References).	2, 6, 18, 31, 43
Buscapade Tour.	71
Booster Recommendations.	54
Park Admission Fees.	86
Refuge Entrance Fees.	87
Hauck, Frederick (Cmdr., USN)	
Astronaut.	18
OPF Ceremony.	66
Helman, Alan (Chairman, Astronauts Memorial Foundation)	
Architectural Competition for Memorial.	72
Higginbotham, Tracey/Sent to MSFC by NASA.	85
Hilmers, David (Discovery Crew).	18, 37
Discovery Power-Up Ceremony at OPF.	66
Hiring Freeze/Budget Deficit Reduction Plan.	85
Holloway Corporation Contract	
Spaceflight Tracking & Data Network (STDN) Facility.	44
Switching Station at LC 39A.	73
Homecoming	19
Horner Citation.	20
House Committee on Science & Technology	
Visit to KSC.	28
House Space Subcommittee	
Hearing on July 13, 1987, Atlas Centaur Accident.	65
Hubble Space Telescope	
June 1989 Launch Date.	78
Hughes Aircraft Company.	10
Commercial Launch Contract.	59
Hunt, Darleen/Chairwoman of KSC 25th Anniversary Committee.	40
Hypergolic Maintenance Facility (HMF)	
GSE Storage Building.	82
Incentive Payment/Lockheed Space Operations Co.	20
Indonesian Satellite/Palapa.	23
INTELSAT Signs Martin Marietta Contract	
Commercial Communications Satellites.	65
Interior Department/Oil Leases Blocked.	45, 49
International Association of Machinists and Aerospace	
Workers Strike.	61
International Steel Industries Contract	
Launch Equipment Shop (LC 39), Modifications.	75
Ivey's Steel Erectors Contract Award.	70
Jarvis, Gregory (Challenger, 51-L Mission Crew).	9
Jemison, Mae/Physician & Astronaut Candidate.	49
Jess Parrish Memorial Hospital (Titusville, FL).	19, 26
Pad Emergency Practice.	77
Johnson, David (NRC Staff Member).	61

Johnson, James	
Deputy Manager, Space Station Project Office, KSC.	37
Johnson Space Center.	34
Jones, Bill (General Dynamics Employee/Strike	61
Jones, C. N. ("Newt")/Brevard County Tax Collector.	2
Justice Department	
Beggs/General Dynamics Case Dropped.	53
Kaye, Stanley/Spaceport USA Tour Bus Driver.	26
Kicklighter, Elliot	
Supervisor, Shuttle Debris Storage Team.	3
Kitchen, Lawrence (Lockheed Chairman)/FIT Speech.	50
Kolcum, Edward H. (Writer, <u>Aviation Week & Space Technology</u>)	8
KSC Employment	
McCartney Press Conference.	72
Lane, Vic, Construction Contract	
Air Compressors at LC 39 Utility Annex	62
Lang, John R. "Bob"	
Director for Safety & Reliability.	60
Launch Complex 36.	32, 56
Launch Complex 39B.	9
Launch Control Center/Window Gaskets	46
Launch Date	7
Launch Pad Emergency Practice	
LC 39B	48, 77
Launch Processes Review	41
Lewis Research Center/Atlas Centaur Accident	81
Layoffs/Challenger Aftermath	57
License Plates	2
Lightning	
Atlas Centaur	30
Atlas Centaur Failure (March 26, 1987)	34, 38, 65
Lockheed Space Operations Co.	
Employees Sent to MSFC by NASA	85
Rehiring	3, 8, 50
Shuttle Processing Contract	20-22
Lounge, John (Discovery Crew)	18
Discovery Power-Up Ceremony at OPF	66
Low, G. David (Astronaut)	
Emergency Landing Exercise	32
Pad Escape Crew	48
Lowe, Don and Norma Lowe	
Challenger Piece Returned to NASA	88
Mahon, Joseph/Launch Processes Review Panel	41
Main Engines.	76
Management & Procedural Changes/Post-Challenger	8
Manned Mission to Mars	36
Marshall Space Flight Center	23
Ultrasonic Inspection of Solid Rocket Boosters.	54
Martin Marietta Corporation	22
Martinez, Bob (Florida Governor)/Space Commission	46

McAuliffe, Christa	
Flag of Learning & Liberty	7
Challenger 51-L Mission Crew Member	9
McCabe, Howard and Nancy McCabe	
Travel With Class (Melbourne, FL)	68
McCartney, Forrest (Lt. Gen., USAF/KSC Director)	
(Text References)	5, 6, 8, 9, 15, 21, 70, 75
Air Force Retirement	69
Discovery Launch Date Slip	90
FIT Commencement Speech	50
Fletcher Names McCartney KSC Director	70
General Dynamics Launch Team Reunion	50
Military Astronautics Trophy for 1987	44
Morale at the Space Center	93
National Management Association Speech	83
National Space Club Meeting	58
OPF Ceremony	66
Open House	40
Press Conference	72
McCluskey, James (Program Manager, Morton Thiokol Inc.)	17
McDonnell Douglas Astronautics Co.	
(Text References)	4, 87
Commercial Launch Contract	59
Commercial Launch Down Payments	36
Employees Sent to MSFC by NASA	85
International Maritime Satellite Organization	66
Large Business Contractor of Year/KSC	89
Payload Ground Operations Contract	4
Rehiring Plans	8
McNair, Ron (Challenger 51-L Mission Crew Member)	
(Text Reference)	9
McNair Award to EG&G Florida	73
Meade, Carl (Astronaut)	
Emergency Landing Exercise	32
Pad Escape Crew	48
Meguiar, George	
(Text Reference)	9
Marketing Manager, Spaceport USA	71, 93
Merritt Island National Wildlife Refuge	
Admission Fees Proposed & Dropped	86-88
Mitchell, Royce (NASA Booster Engineer)/Extreme Testing	92
Mix, Boyce (MSFC Resident Manager at NSTL)	
Engine Tests	88
Molgaard, Donald (TRW)/Space Congress Speaker	37
Morale/Overtime	58
Moran, Edward (AMF Director)	
Education Plans for Spaceport USA	84

Morton Thiokol Inc.	
(Text Reference)	17
Drug Testing	43
Redesigned Solid Rocket Booster Test Firing	68
Solid Rocket Booster Manufacturer	92
Test Firing of Redesigned Solid Rocket Booster Aborted.	91
Mullane, Richard (Col., USAF)/STS 27 Crew Member	90
Murphy Memorial Service	7
Myers, Dale (Deputy Administrator, NASA)	
(Text References)	1, 44
Space Congress Speech	36
Test Firings of New Boosters	44
NASA Causeway/Repaving Contract	45
NASA-Kennedy Management Association/Martinez Speech	46
National Park Service	
Beach Access Road Contract	49
Playalinda Beach Access	5
National Press Club/Beggs	53
National Research Council	
Booster Recommendations	54
Seamans, Robert (Head of NRC Committee)	56
Stever, Guyford (Panel-Chief)	85
National Space Club Meeting	
Tyson's Corner, VA	58
National Space Technology Laboratory (Bay St. Louis, MS)	
(Text Reference)	88
Engine Tests	76
Naval Ordnance Test unit	15
Neely, Cheryl (McDonnell Douglas Astronautics Co.)	
Astronaut Candidate	32
Nelson, Bill (U. S. Representative, D-Melb., FL)	
Beach Access	49
Entrance Fee Opponent	89
Keynote Speech to 24th Space Congress	36
LaCita Country Club (Titusville, FL) Meeting	62
Oil Leasing	45
Security hearings	22
Nelson, George "Pinky" (Discovery Crew Member)	18
Netcher, Morrissa	
Space Congress Science Fair Winner	38
Neuharth, Allen H. (Chairman, Gannett Co. Inc.)	
Buscapade Ends at KSC	71
New World Services Inc.	
Subcontractor of the Year	89
NOAA Launch Delay	13
Nose Cone Tests	54
Nozzle Tests/Morton Thiokol Inc.	75
Nuclear Protesters/January 1987	73

O'Connor, Edward (Col., USAF)/Challenger Recovery Team Leader	
Salvage Operations Chief	16
Space Congress Achievement Award Recipient	36
Odom, James	
Investigation Head for Atlas Centaur Probe	58
Marshall Space Flight Center	58
Space Committee Hearing	65
O'Malley, Tom/Friendship 7 Test Conductor	16
Occupational Health Facility	22
Office of Commercial Programs/Office of Safety	50
Oil Leases Blocked	49
NASA Flight Clearance Zone	45
OMRF's First Use	72
Onizuka, Ellison (Challenger 51-L Mission Crew Member)	9
OPF Ceremony	66
Operations Support Building/LC 39	1
Orbiter Maintenance & Refurbishment Facility	
Columbia Modifications	71
Orbiter Processing Facility	6
Orlando Regional Medical Center (Orlando, FL)	
Pad Emergency Practice	77
Oswald, Stephan/Pad Escape Crew	32, 48
Overtime/Sharp Reduction	4
Pad Escape	48
Palapa Launch for Indonesia	23-24
Patrick Air Force Base/McCartney Speech	7, 50
Payload Weight Increases for Shuttles	
Truly, Richard (Associate Administrator, Space Flight, NASA)	86
Perry, Norm/NASA Industry Assistance Officer, KSC	89
<u>People</u> Magazine/Buscapade Ending at KSC	71
Phelps, Ron/Debris Storage Team	3
Pioneer Systems Inc./Unmanned Shuttle Systems Recovery	84
Pisco, Anthony (Lockheed Engineer)	19
Planning Research Corporation	81
Layoffs	10
Systems Services Extension	6
Playalinda Beach	5
Congress Appropriates Construction Funds	49
Precision Mechanical Inc.	
Contract for Construction of Cooling Tower at VPF	59
Protester Arrests (21)	4
Proxmire, William (Senator, D-Wis.)	33
Quality Control/SPC	21
Quality Control Workers Needed/NRC Report	61
Reagan, Ronald (President of the United States)	
Budget, FY 1988	1
Challenger Commemoration	10
Red Guards	76

Reeser, Alvin L. (Col., USAF)	23
Rehiring/McCartney Prediction	7, 15
Requests for Proposals (RFPs), Space Station	36
Resnik, Judy (Challenger 51-L Mission Crew Member)	9
Reyes and Lang Promotions/KSC Safety Office Co-Directors	60
Reyes, Raul E. "Ernie"	61
Richman, Arnold/Chief of Visitors Services at KSC	64
Rocket Failure	24
Rockwell International	23, 87
Employees Sent to MSFC by NASA	85
Lost Wrench in Discovery.	46
Morton Thiokol Inc.	22
Rodney, George/NASA Safety Chief	26
Roe, Robert (U. S. Rep., D-NJ)	
Chairman, House Committee on Science, Space & Technology.	28
Rogers Commission	
(Text Reference).	8
Overtime Issue	58
Ross, Jerry (Lt. Col., USAF)/STS 27 Crew Member	90
Royko, Ray (Astrotech International Attorney)	
Closing of Astrotech Space Operations Facility	35
Runway Safety Nets	17
Rushing, Debbie/Trading Places With Dubai	52
Russell, William/Launch Processes Review Panel	17, 41
Rutledge, Paula	
USBI Employee Sent to MSFC by NASA	85
Rysavy, Gordon (JSC)	
Satellite Service Project Engineer	37
Safety Management Philosophy	71
Sarakon, Dan (General Dynamics Corp.)/Atlas 109D	16
Scherer, Lee (General Dynamics)	
Commercial Space Programs Director	51
Schirra, Walter (Mercury Seven)	10
Schroeder, Paul/Space Congress Science Fair Winner	38
Scobee, Dick (Challenger 51-L Mission Crew Member)	9
Seamans, Robert (NRC Committee)	56
Security	4
Hearings/Nelson	22
KSC/NASA Lacks Money	73
Shands Hospital (Gainesville, FL)	
Pad Emergency Practice	77
Shepard, Alan (Mercury Seven)	10, 87
Shepherd, William (Cmdr., USN)/STS 27 Crew Member	90
Shuttle Calibration Laboratory Support Services	
Bionetics Corp.	63
Shuttle Flight Plans	78
Shuttle Landing Facility	
Discovery Crew Arrival	18
Lightning Strike, March 26, 1987	26
Protesters Arrested	4, 5

Spain, Senegal & Morocco/Alternate Sites . . . . .	.17
Sieck, Robert (Launch Director) . . . . .	.32
December 23, 1987 Test Failure/Launch Schedule . . . . .	.49, 93
Launch Delay . . . . .	.40
Launch Procedure Changes . . . . .	.12
Slayton, Deke (Mercury Seven) . . . . .	.10
Smelser, Jerry (Marshall Space Flight Center)	
Deputy Manager, Engine Project . . . . .	.88
Smith, Dennis L., Inc., Contract Award . . . . .	.45
Smith, Mike (Challenger 51-L Mission Crew Member) . . . . .	.9
Smith, Richard/Former Kennedy Space Center Director . . . . .	.20
Smithsonian Institution	
"The Artist and the Space Shuttle" . . . . .	.64
Solid Rocket Booster	
Freed By Explosion . . . . .	.56
Passes Firing Test/August 30, 1987 . . . . .	.69
Redesigned Booster Test . . . . .	.17
Segments Arrival from Morton Thiokol Inc. . . . .	.82
Stacking/NRC Recommendations . . . . .	.54
Test Cost/\$15 million . . . . .	.69
Test Failure (December 23, 1987) . . . . .	.93
Test Success/Brigham City, Utah . . . . .	.46
Soviet Delegation/Tour of KSC Facilities . . . . .	.19
Soviet Launches Off-Limits to U. S./State Department	
Announcement . . . . .	.56
Space Biology Program . . . . .	.38
Space Congress, 24th	35, 37, 41
Space Flight Safety Panel	
O'Connor, Bryan (Col., USAF), Panel Head . . . . .	.71
Space Station	
Approval . . . . .	.30
Contracts Awarded . . . . .	.87
Cost/National Research Council Report (\$25 Billion) . . . . .	.56
FY 1988 Budget . . . . .	.1
Processing Building . . . . .	.1
Reagan, Ronald (President of the United States) . . . . .	.30
Spacelab Experiment Integration Support Program/Boeing . . . . .	.4
Spaceport USA - Art Gallery Opens . . . . .	.11, 19
(Text Reference). . . . .	.74
Anniversary - 20th . . . . .	.64
Attendance . . . . .	.29, 70, 78, 93
Education Plans, AMF . . . . .	.84
Exhibits . . . . .	.13
Martinez Speech . . . . .	.46
Tour Bus - Protesters . . . . .	.5
Specialty Maintenance and Construction Inc.	
Construction of OPF Annex Addition . . . . .	.6
Standby Scrub Team . . . . .	.4

State Department	
Prohibition of Soviets Launching U. S. Payloads	56
Stevenson, Charles (KSC Test Director)	
Booster Segments	83
Stever, Guyford (Chief, NRC Panel)	
Panel Recommends More Tests for SRBs	85
Stofan, Andrew/Space Station Program Director	37
Strike	17
Tanner, John/Safety Nets	17
Tashunda/Sent to MSFC by NASA	85
Teleconferences.	12
Telstar's 25th Anniversary/Thor-Delta Rocket	57
Thai Officials Tour KSC	
Tinsulanonda, Preem (Prime Minister)	75
Thomas, James A. "Gene"	
Launch Processes Review Panel	41
Director of KSC SR & QA Office	60
Thomas, John (Dir., NASA's Solid Rocket Redesign Team)	
August Booster Success	72
Thompson, J. R. (Marshall Space Flight Center Director)	
Second SRB Test Firing	91
Thornton, Kathryn (Astronaut)	
Emergency Landing Exercise	32
Thrust Vector Control Deservicing Facility	19
Thuot, Pierre (Astronaut)	
Emergency Landing Exercise.	32
Pad Escape	48
Titan 34D	
Pentagon's Classified Payload (November 30, 1987)	86
Vandenberg Air Force Base (CA)	78
Titusville, Florida	
Area Chamber of Commerce	14
City Council	50
Tornado Report	67
TPS System Redesign	
Wing/Elevon Cove Area & Nose Cap Area	65
Trash Found in Columbia's External Tank	90
Tremml, Glen (Flier)	
Project Daedalus	80
Trident 2	4
Truly, Richard (Assoc. Administrator, Space Flight, NASA)	
(Text References)	31, 33
Atlas Accident Report	59
Atlas Report	41
House Space Subcommittee Hearing	65
Launch Delay for Discovery	35
Solid Rocket Booster Test Success	69
TDRS	44
Turnaround/TPS Redesign	65
TW Services Inc.	9, 11

Uman, Myron (National Research Council Dir.)	
December 23, 1987, Test Failure	92
United Plant Guard Workers of America	
Security Workers Union	89
United Technologies	7, 20, 23, 43
University of Florida	
Industrial Seminars Contract for KSC	21
Research Into Layoffs	81
Utsman, Thomas/Deputy Center Director	4
Director, Space Transportation System Management, KSC.	41
Freeze Implications	85
VA Paving Inc./Woman-Owned Business of the Year	89
Vandenberg Air Force Base	3
General Dynamics Strike	61
Launch Rate With Second Generation Shuttle	38
Space & Missile Test Center	23
Vehicle Assembly Building	10, 22
Vehrs, Steven	
Merritt Island National Wildlife Refuge Director	89
Vertical Processing Facility (VPF)	
Cooling Tower Construction Contract	59
Volz, Richard (Aerospace Safety Advisory Panel)	
Engine Tests	76
W & J Construction Corp. (Cocoa, FL)	
LC 39 Operations & Support Facility	77
Wade, Mary Lou	
Sent to MSFC by NASA	85
Wailles, Bill (VP, Pioneer Systems Inc./ West Melbourne, FL)	84
Walberg, Gerald (Chief, Space Systems Division, Langley)	
Second Generation Shuttle	38
Wang, Clifford/Space Congress Science Fair Winner	38
Washburn, Kathleen/Space Congress Science Fair Winner	38
Washington State University/Space Biology Program	38
Weather at Kennedy Space Center.	27
West Schwartz Road/Tornado Reported.	67
Wind Damage	
United Technologies USBI Shuttle Building	67
CBS and ABC Broadcasting Buildings	28
Wistrand, Gary (KSC Security Officer)	
Anti-terrorist Fence	73
Womack, James (Expendable Vehicles Operations)	
Atlas Anniversary Speech	43, 50
Wuesthoff Hospital's Center for Health Awareness	
Port St. John, FL/Drug Tests	43
Young, John (Chief of Astronaut Office)/New Post	27



Report Documentation Page

1. Report No. KHR-12	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Chronology of KSC and KSC Related Events for 1987		5. Report Date MARCH 1988	
		6. Performing Organization Code	
7. Author(s) KEN NAIL, JR.		8. Performing Organization Report No.	
		10. Work Unit No.	
9. Performing Organization Name and Address NEW WORLD SERVICES, INC. KENNEDY SPACE CENTER		11. Contract or Grant No.	
		13. Type of Report and Period Covered ANNUAL, 1987	
12. Sponsoring Agency Name and Address National Aeronautics & Space Administration Kennedy Space Center		14. Sponsoring Agency Code	
15. Supplementary Notes This chronology is published to fulfill the requirements of KMI 2700.1 (as revised) to describe and document KSC's role in NASA progress. Materials were researched and prepared by New World Services, Inc., EG&G Florida subcontractor for KSC Library Services.			
16. Abstract The document is intended to serve as a record of KSC events and as a reference source for historians and other researchers. Arrangement is by day and month and individual articles are attributed to published sources. An index has been added to this edition.			
17. Key Words (Suggested by Author(s)) Chronology, space shuttles, solid rocket boosters, Discovery, contracts, awards, Challenger, accidents		18. Distribution Statement Unclassified-Unlimited	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of pages 110	22. Price